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AUGUST 1969

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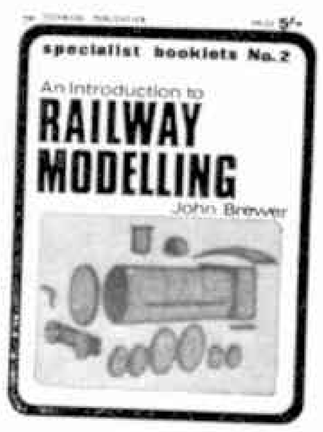

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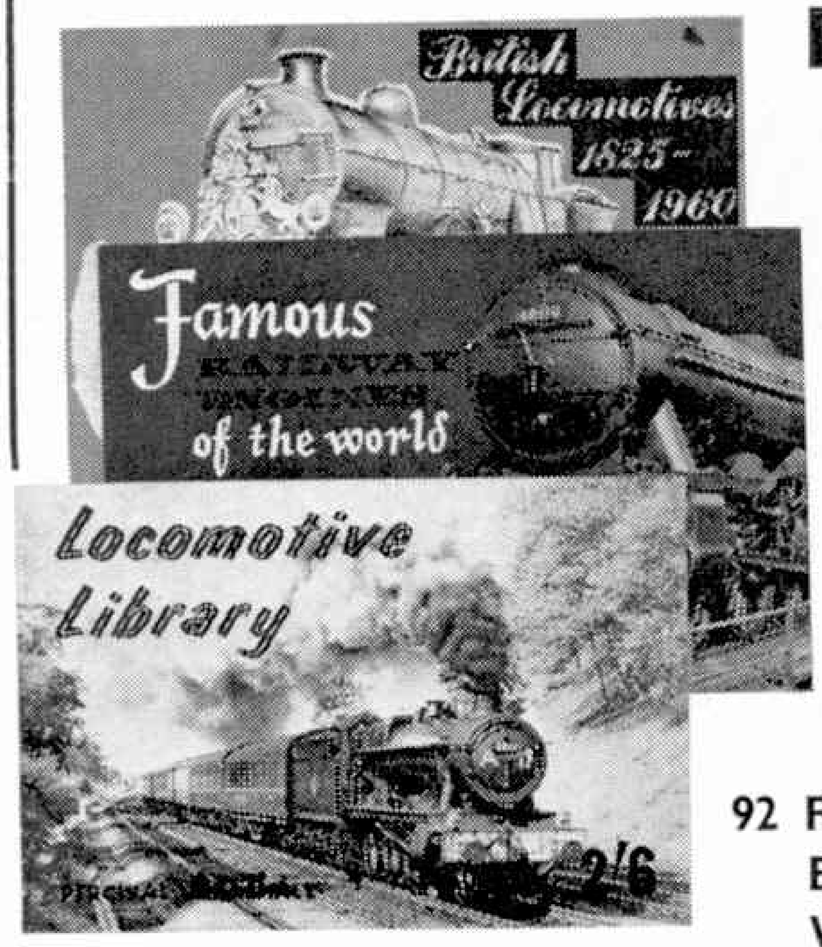

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AUGUST 1969 VOLUME 54 NUMBER 8

Meccano Magazine, founded 1916.

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DAVE ROTHWELL

Consulting Editor for Meccano Ltd.
J. D. McHARD

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MAP **HOBBY MAGAZINE**

FRONT COVER

Our cover shows a typical scene to be found on any camping site during the summer, and could be practically anywhere in the world.

In fact it is Alec Gee, Editor of our sister magazine *Model Cars* (and incidentally an absolute novice to camping) trying out life under canvas and is shown here at a site near Whipsnade Zoo, just six miles from our office.

At the time this photograph was taken, some two hours after he arrived on site, Alec was completely settled in, and as he put it—"Just having a spot of grub."

Photograph by the Editor.

NEXT MONTH

Big news for readers concerning the September issue of *Meccano Magazine*, it is the first of our new series on Two Wheelers. Staff members, in conjunction with experts on two wheeled machines, present their first report on a brand new motor scooter. This series, covering mopeds, scooters and motorcycles, is a new venture for the magazine and bears all the marks of being a big success with our readers.

For Meccano constructors, in particular the advanced modellers, a superb working model of Taylors Rope making machine, and a fabulous Vintage Model "T" Ford. A general article on how Meccano helps the handicapped person provides interesting reading, and is just another example of this versatile construction system.

Radio 4-2 gets well under way with another free booklet, describing the practical application of fitting out a model boat hull with a motor and radio control.

As always our regular features appear, favourites such as John W. R. Taylor's "Air News," James A. Mackay's "Stamps," Charles Grant's "Battle" features, and many others.

Keep an eye open for our Lightweight Motor Scooter cover.

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CONTENTS

WORKBENCH 381
News and views by the Editor

MODEL VILLAGES 382
The story behind these miniature masterpieces

THE CALL OF THE ISLES 384
Walking in the outer Hebrides

"N" GAUGE RAILWAY LAYOUT 386
Part II of a series

TRANSPORT TOPICS 388
Australia's buses

GREAT ENGINEERS 389
No. 19 Lord Nuffield

ON TWO WHEELS 390
An Introduction to motor cycling, etc.

AIR NEWS 392
John W. R. Taylor on Aviation

FROM PASSENGER SERVICE TO YACHT MARINA 394
The story of a veteran paddler

THE PRINCE OF WALES ON STAMPS 396
Stamps on a theme by James A. Mackay

BOOK REVIEWS 397
The newest publications reviewed

LIGHTWEIGHT CAMPING 398
An Introduction to this outdoor activity

DINKY TOY NEWS 401
Chris Jelley reviews the latest Dinky toys

AMONG THE MODEL BUILDERS 402
Readers' Meccano Ideas

LOOK AT NATURE 404
Two delightful models for younger modellers

HAMMERHEAD CRANE 406
The Meccano model on last month's cover

U.S. GIANT IN MECCANO 408
An advanced locomotive described

BATTLE 412
Part XVI. "Action at Twin Farms"

MILITARIA 414
A Military review by Charles Grant

TRIP TO THE SEASIDE 416
John Brewer talks about veteran coaches

HAVE YOU SEEN 417
The latest products reviewed

THE HUMBROL STORY 418
History of the Humber Oil Co. Ltd.

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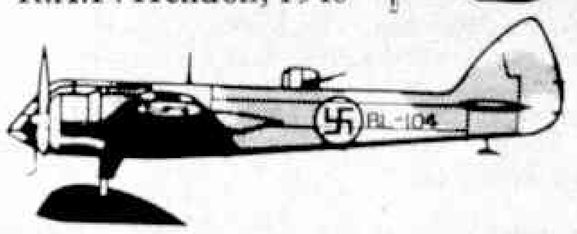

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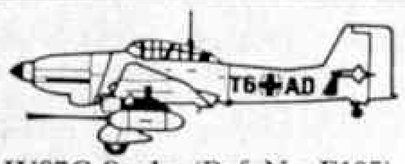

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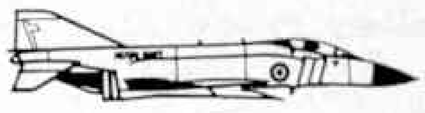

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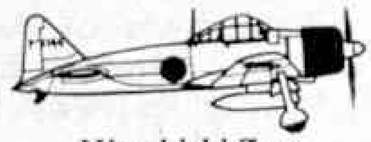

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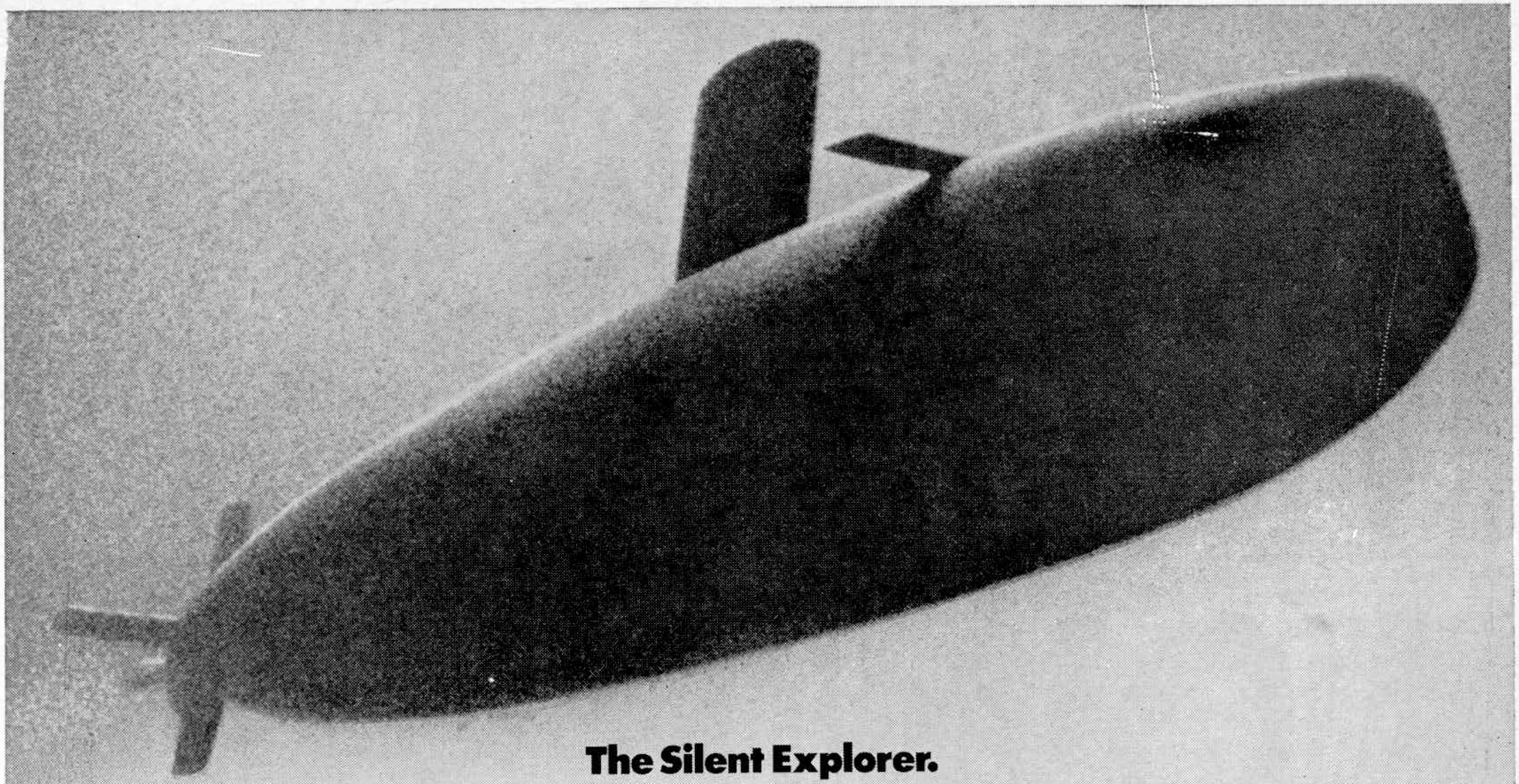

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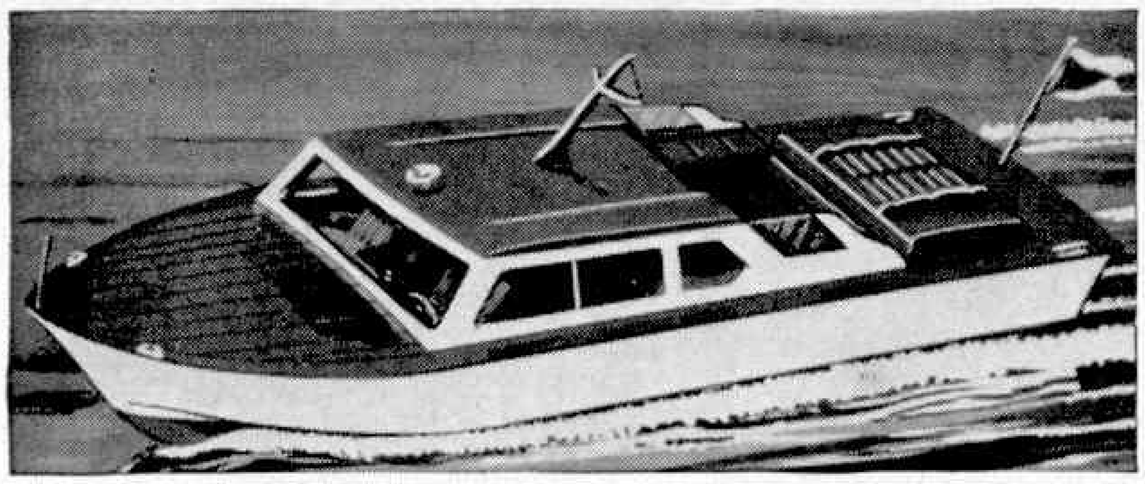

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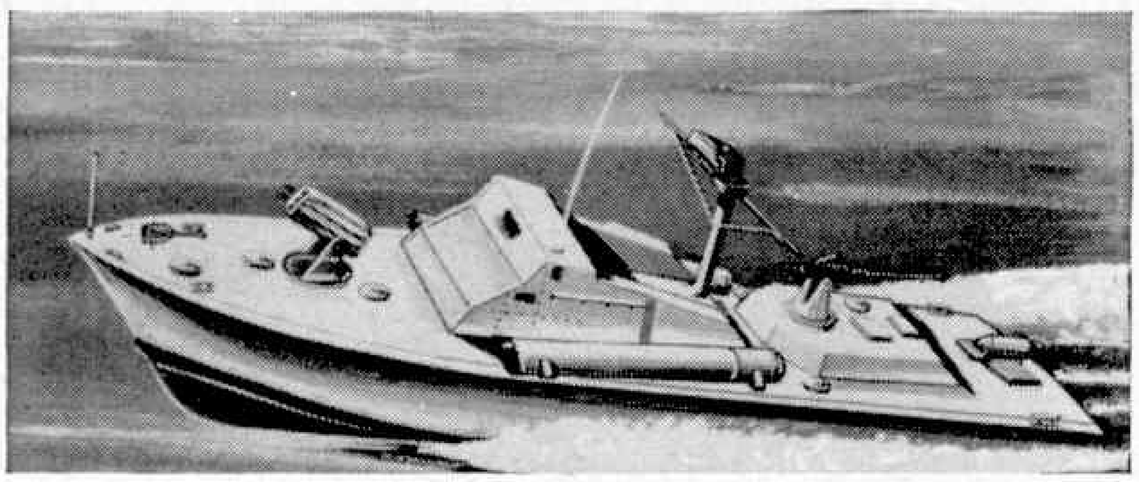

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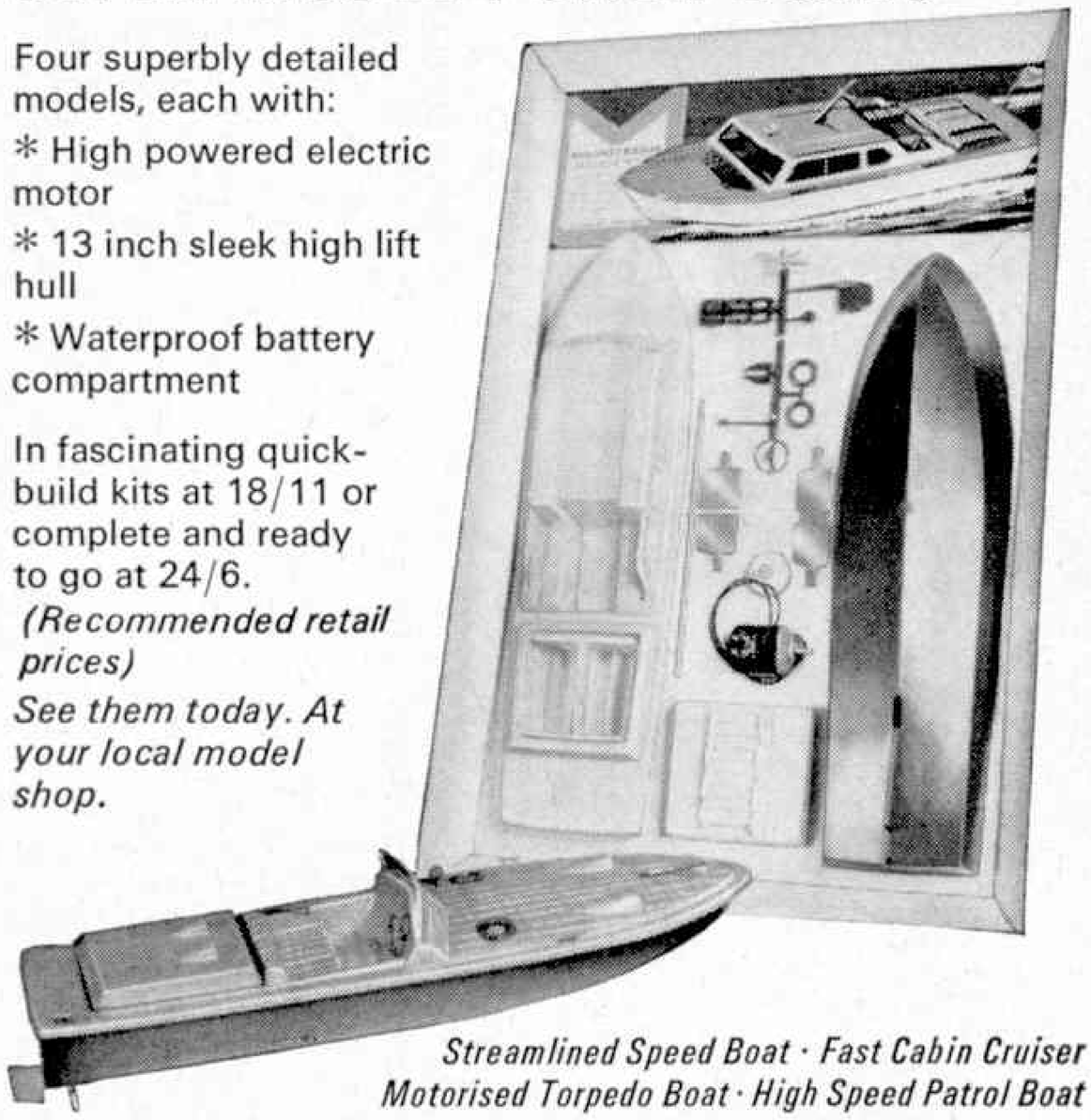

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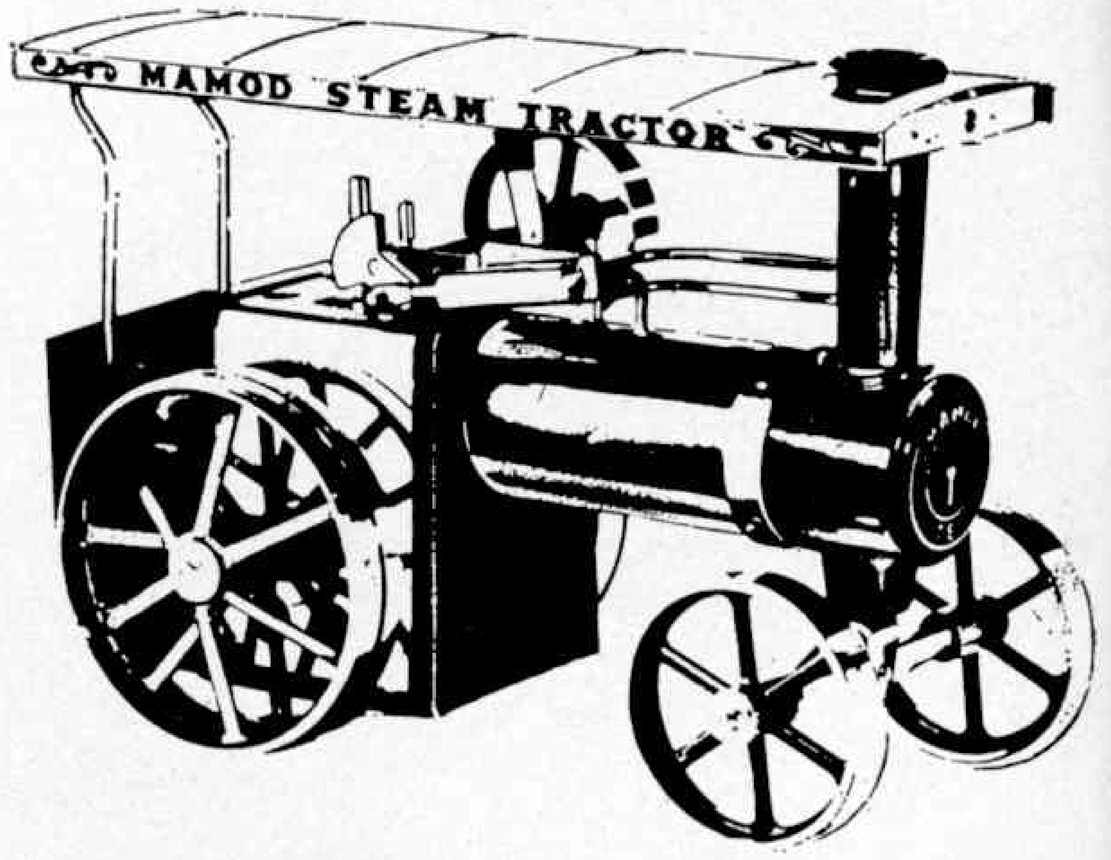

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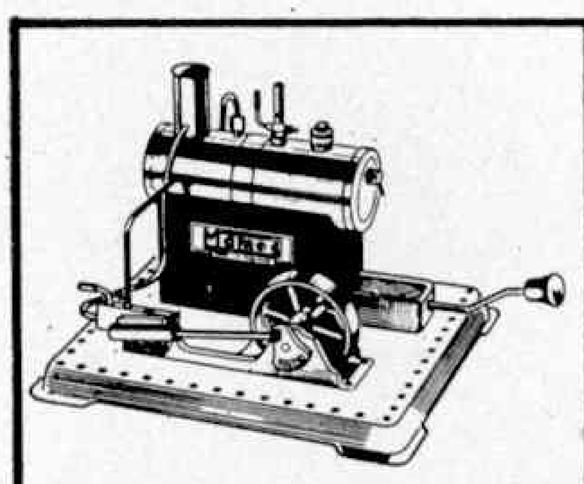

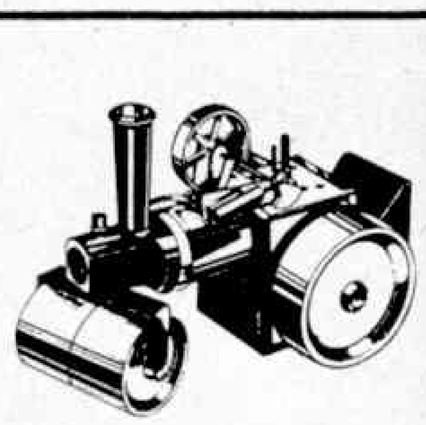

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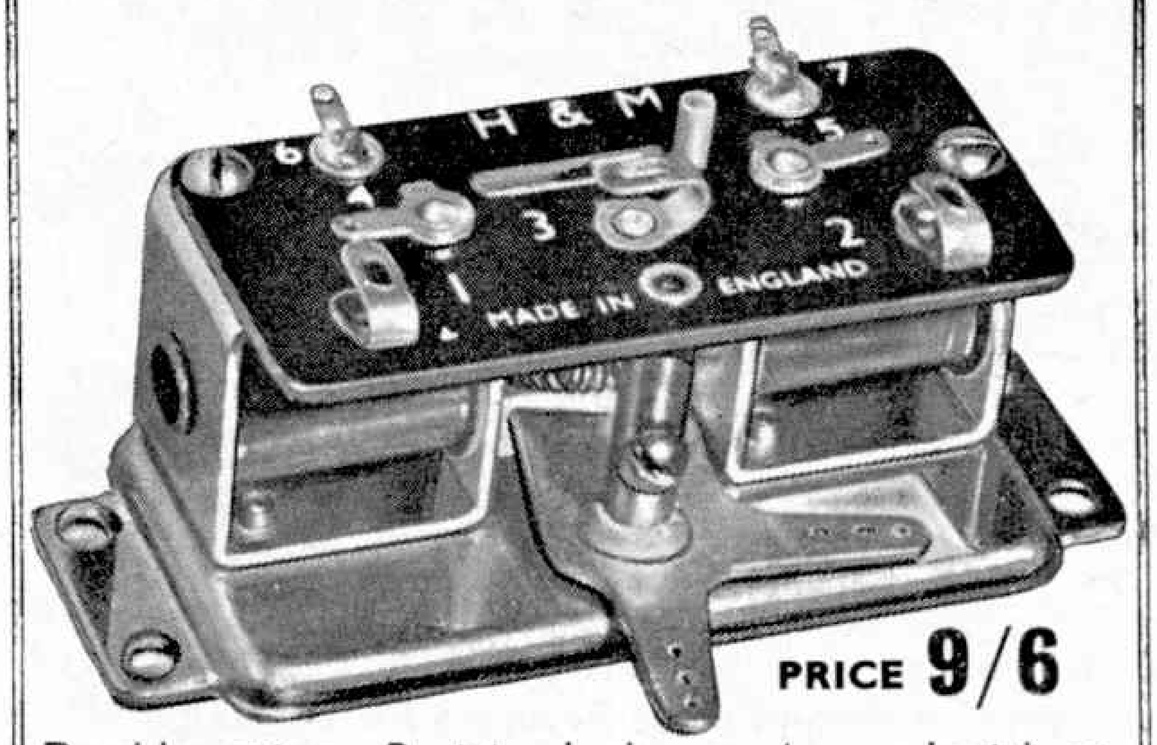

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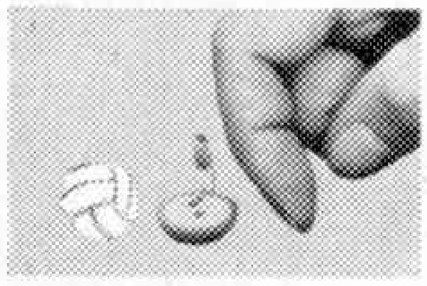

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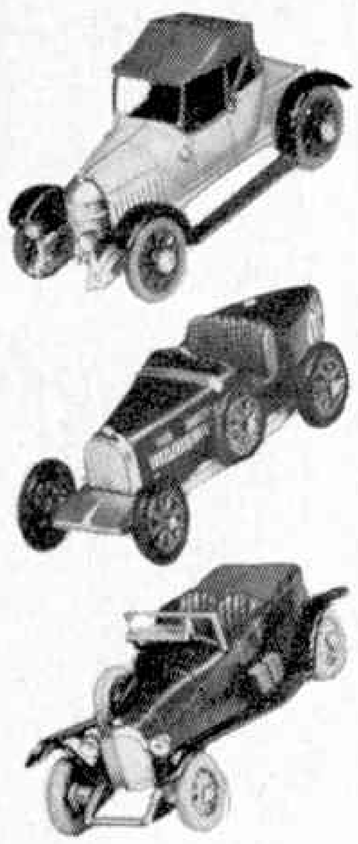

A plastic miniature model motor cars construction set of 10 Veteran & Vintage Cars. Also contains paints for colouring the cars, and fittings, for displaying the models in a museum. Examples of made up models are shown above. Retail: 16/11 in the U.K. All model shops should stock "Replicars."

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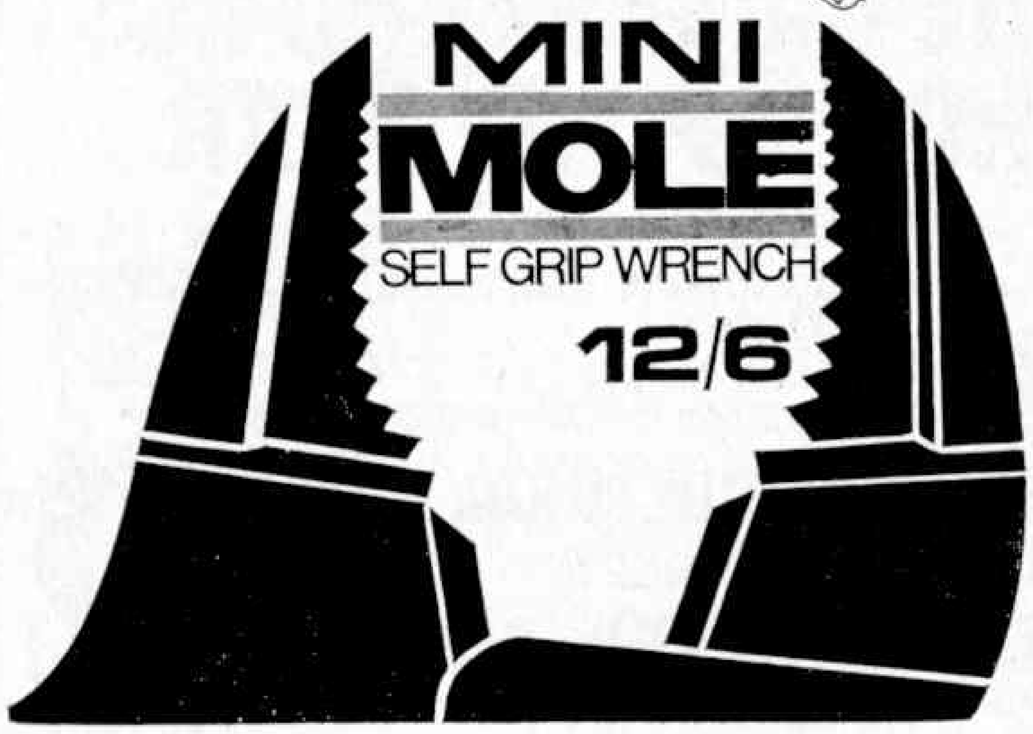


Coming September 12th

Response to the sample issue has been overwhelming! Retailers, manufacturers, modellers from all over the world have been unanimous in expressing their enthusiasm for our new title.

Already the pattern of response to our Questionnaire indicates specific demands for features as yet untouched in the field of modelling journalism.

Plans, close-up photographs, sketches, colour information, aircraft, armoured fighting vehicles and naval vessels will be regular features.

Quotes thus far from readers of the sample issue:

" If you continue as this issue you must have a winner."
" Balance of issue just great."
" Will be a sure-fire hit."
" Keep it up! "
" I like everything in Scale Models."
" A marvellous magazine."

Photographic Competition Winners

MOST READERS will remember, that in the June issue of *Meccano Magazine*, we gave details of our Photography Competition.

We received many entries but none, unfortunately, for the "Outdoor Activity" section. It was a hard task indeed to decide the winners of the "National Trust" section, however the judges did manage to decide and proclaimed Mr. R. M. Smart's captivating photograph of two swans taken at the loch at Culzean Castle, Ayrshire, as the winner. Mr. R. Hammond was a very close runner-up, with his excellent selection of photographs taken at "Cannock Chase".

We would like to remind readers that this competition will be run every month, throughout the summer, until 31st October.

Full details of the competition were printed in the June Workbench, so keep those cameras clicking.

The International Coin Club

More and more people are becoming influenced by England's fastest growing hobby; coin collecting.

The International Coin Club was first started in 1965, when six coin dealers organised a series of coin fairs. This organisation was so successful that the founders formed a National Coin Club—so the International Coin Club was set up as a non-profit making association of members sharing a common interest. Its main aim is to give expression to the voice of coin collectors throughout the country, through the medium of its membership. The club will give the members certain facilities, such as: their own building, their own library, their own magazine and their own elected body of representatives.

To begin with, the basic facilities will be the benefit of being a member of a national club for the encouragement of Numismatics, a periodic magazine distributed free to members, free admission to Coin Fairs organised by the International Coin Fair Organisation, a personal membership card with holder and lapel badge, and an information service.

It is hoped, in the future, to expand the information services and to have a reference library, research facilities, local advisory services, and films, accompanied by lectures. These films will be distributed to other Clubs and Societies.

Applications for Founder-Members of the International Coin Club will be available at the 5th International Coin Fair, to be held at the Cumberland Hotel on 12th, 13th and 14th June, or from the Registered Offices at Morley House, 320 Regent Street, London, W.1. It has been decided to limit the application to the International Coin Club for those people of 18 years or over.

Aerofilm Library

Recently we have received information on a very unusual library, not the usual book kind, but one which specialises in photography, and is the only one of its kind in the world.

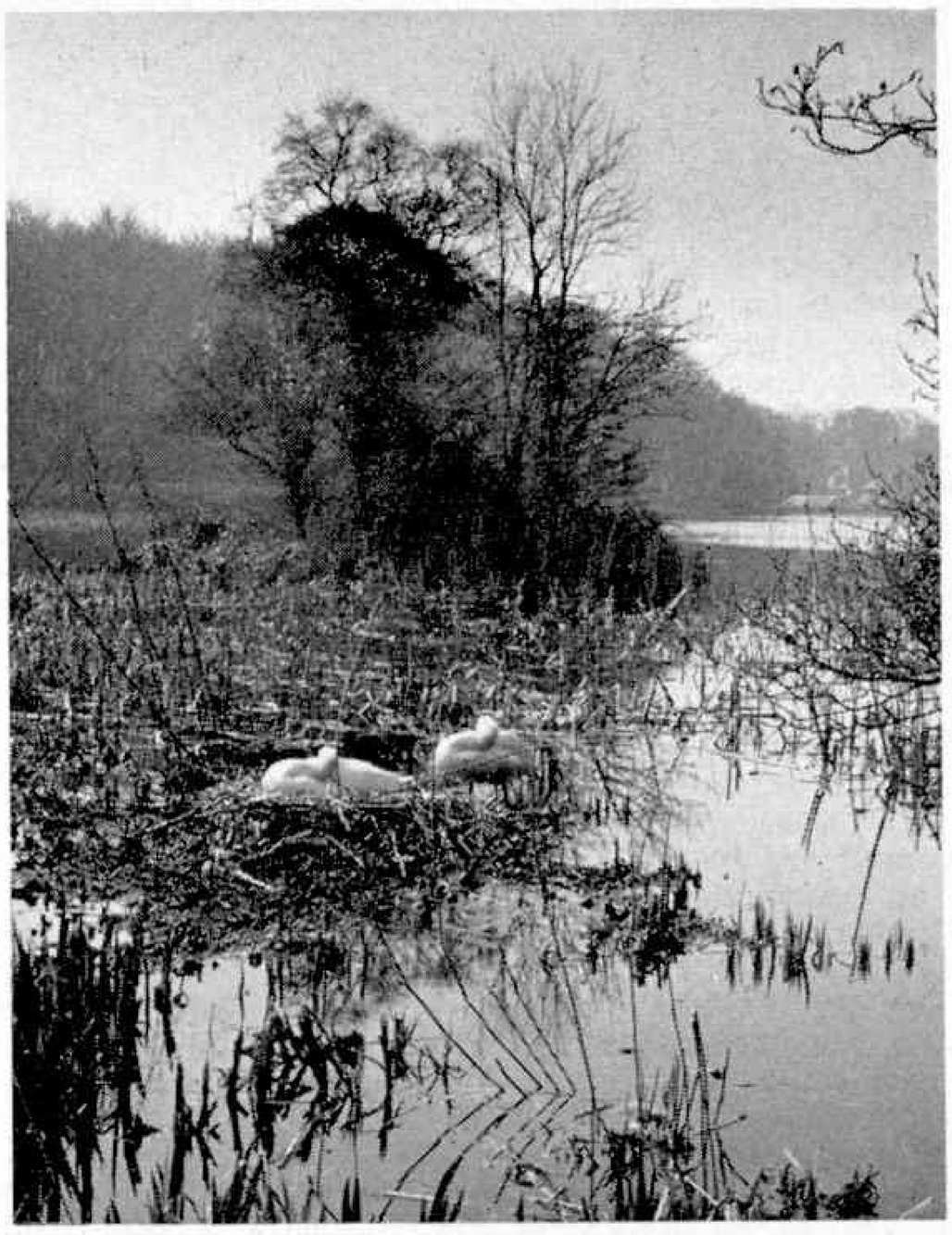
The library contains over 300,000 photographs of places and features from (as the company proudly proclaim) "Everything from Ox-Bows to Oxford". Many of the photographs are aerial views of towns, cities, geographical features, etc. In fact attempting to describe the range presents a fearsome task!

Students, wishing to obtain photographs to illustrate a thesis will find this library of tremendous help, in fact anyone wanting a photograph of *anything* should get in touch with the Library.

The libraray is open for viewing from 9 a.m. to 5.30 p.m. Monday to Friday, and is situated at 4 Albemarle Street, London, W.1.

For anyone interested who cannot make a visit to the library, the company publish a book of selected photographs which is reviewed in "Recommended Reading" on page 397 of this issue.

COMPETITION WINNER

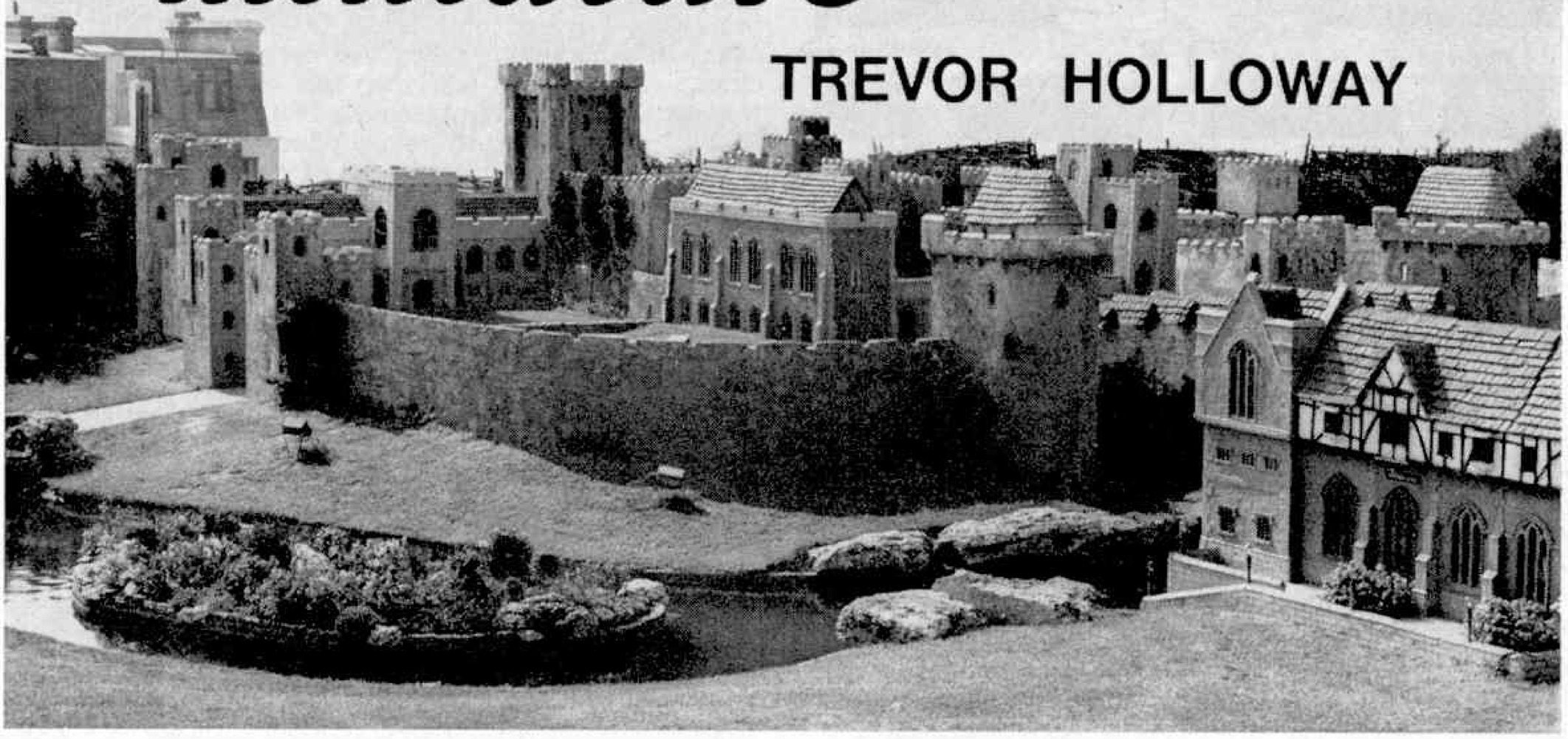


This is the delightful "National Trust" photograph taken by reader R. M. Smart which won him first prize in this month's competition.

Shopping Around

We would like to inform readers, that after 13 years in business at 1 Hosier Street, Reading, THE MODEL SHOP (READING MODEL SUPPLIES) is now moving to more modern premises at 5 Chatham Street, Multi-Storey Car Park, Oxford Road, Reading. Local modellers please note.

Masterpieces in miniature



TREVOR HOLLOWAY

ONE MORNING in 1936, Charles Morris, landlord of "The Old New Inn" at Bourton on the Water, in the heart of the lovely Coswold country, was gazing thoughtfully at his vegetable garden wondering how he could convert it into something more attractive.

His first idea was to reproduce a miniature glen with waterfall and stream flowing through a grassy valley, and spanned by little stone bridges in the village. Then he thought of a much more ambitious scheme—to reproduce the *whole* of the village in miniature, from the Church of St. Lawrence down to the smallest cottage.

Rome wasn't built in a day, neither was the model village of Bourton on the Water! Actually it took Mr. Morris and five other men four years to complete the task. Every building and every feature was carefully reproduced to the scale of one-ninth of the original, and everything was set exactly in position.

One of the most fascinating features of the village is the miniature River Windrush, about three feet wide, flowing from the working model of the mill through the whole length of the village. It is spanned by five little stone bridges, all of which are precise replicas of the famous bridges of Bourton.

Dominating the village is the Church of St. Lawrence and visitors are at once attracted by the voices of the choir which have been specially recorded and are relayed from a loudspeaker hidden away in the tiny chancel. The clock in the tower chimes every quarter hour, and the largest bell is only six inches in diameter.

The Baptist Church, with its beautifully carved miniature rose window, is also equipped with recordings of church music, and like the Church of St. Lawrence, it is completely furnished within. The shops of the butcher, baker and grocer are all to be seen, built of mellow Costwold stone, as are the bank, post office, smithy and the numerous other buildings.

The village can be viewed through a special kind of periscope which gives the illusion that it is the visitors who are small and the buildings life-size. Perhaps even more remarkable than the model village is the amazing *model* of the model village! It is small wonder that Bourton's Lilliput village attracts many thousands of visitors every year, including large numbers from overseas.

Britain's Lilliput villages are not mere collections of toy houses constructed of plaster and plywood. They are marvels of miniature craftsmanship, scale-built of brick and stone, exact reproductions of the various periods of architecture they represent—from Norman to the present day.

There are castles, ruined abbeys, country mansions, schools and colleges, and almost every type of building one might expect to find in rural England today. So perfect are they in detail that unless photographed with people in the picture to give a clue of their scale, it is well-nigh impossible to tell from the photograph that they are not actual full-scale buildings. Even the trees and shrubs in the gardens are miniature living plants.

A close rival to the model village at Bourton is "Little Britain", which you will find along the sea-front at Weston-super-Mare. It comprises over fifty buildings and covers half an acre. It is not intended to be a model of any particular village, but rather a composite picture of all that it best in architecture in rural Britain.

Actually, "Little Britain" comprises the country town of Compton Fiddlestix and the nearby village of Stocks Green. The model took four years to build and nine months to "marry" to the site. One thousand miniature trees and shrubs had to be planted, lawns established, hundreds of electric lights installed, and sixty tons of Forest of Dean stone were required for landscaping purposes. The scale employed was 1 in. to 1 ft.

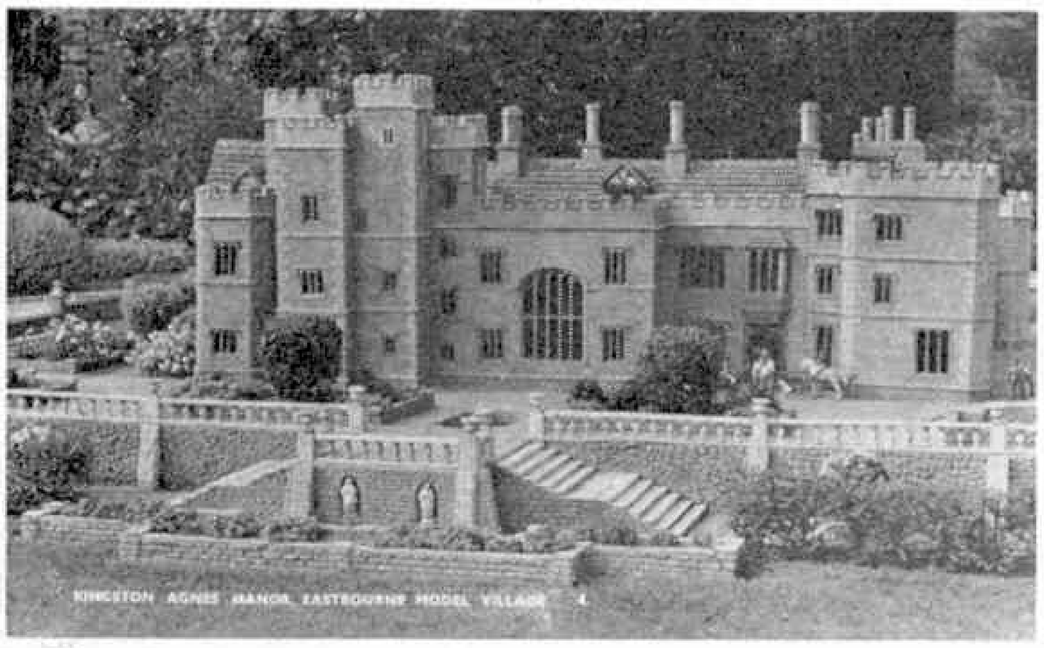
Compton Fiddlestix has an imposing town hall, a

solid old stone-built inn, picturesque alms houses, police and fire stations, antique shop, cafes and hotels. On the far side of the river stands St. Crispin's College, complete with its own chapel, from the inside of which comes the sound of organ music. As a background, the town has a fine old medieval castle with moat, and some charming waterfalls.

Beyond the town is the manor house, complete with real miniature roses growing in profusion. There are oast houses, a windmill, a ruined abbey and a fine old coaching inn.

The story behind the building of " Little Britain " is the story of a man who made his hobby his profession. He is Mr. S. E. Deboo, of St. Leonards-on-Sea, who has also designed the model villages at Ramsgate, Eastbourne and Hastings.

Says Mr. Deboo: " Ever since I was old enough to carve my initials on the dining-room table (and in spite of the hiding I got for so doing!) I have been passionately interested in wood-carving and model-making. Later, this was coupled to an equally great interest in landscape gardening—in particular, rock work and the growing of miniature shrubs and flowers. At the age of thirteen I was privileged to help with the building of the first model village in the world—at Bekonscot, Buckinghamshire. My work is both my pleasure and my hobby."



Above: Kingston Agnes Manor, Eastbourne.

Top: General view of the village at Bourton on the Water.

Bottom: The Abbey at Eastbourne Model Village.

The model village at Bekonscot, Bucks, 'father' of all model villages, is a delightful mixture of ancient and modern, set against a background of trees and bushes. There are houses of brick, stone, plaster and timber, all of which are now mellowed by time and weather.

Model railway fans in particular will be interested to know that Bekonscot model village has its own miniature railway, complete with country station and scale-model rolling-stock. It is a village which has managed to keep its old-world charm, yet at the same time adapt itself to modern trends.

The model village at Hastings is called Ganneymede. It covers half an acre and took three years to build. This particular village is famed for its old-world buildings, such as the Bishop's Lodging house, Prior's Cloister, Bargate, Vintners' Hall and the impressive ruins of Tangbourne Abbey.

We can stroll around the boundaries of the parish church with its well-kept churchyard, then pass on our way to old Fosse Mill and so to the 'massive-in-miniature' Ganneymede Castle, which stands sentinel at the bend of the river commanding the approaches

to the village.

There is much else to see at Ganneymede—the stately building of King's College; Home Farm with its quaint old oast houses; Callis Court Manor, standing in gracious parkland; and hundreds of miniature flowers and shrubs, including dwarf rhododendrons, azaleas, daffodils, roses and conifers.

An outstanding feature of the model village at Eastbourne is a model of historic Fountains Abbey, Yorkshire. The real abbey stands in ruins, but the model at Eastbourne shows us the abbey as it would be if ever rebuilt. It is based on expert research and is claimed to be one of the finest architectural models in the country.

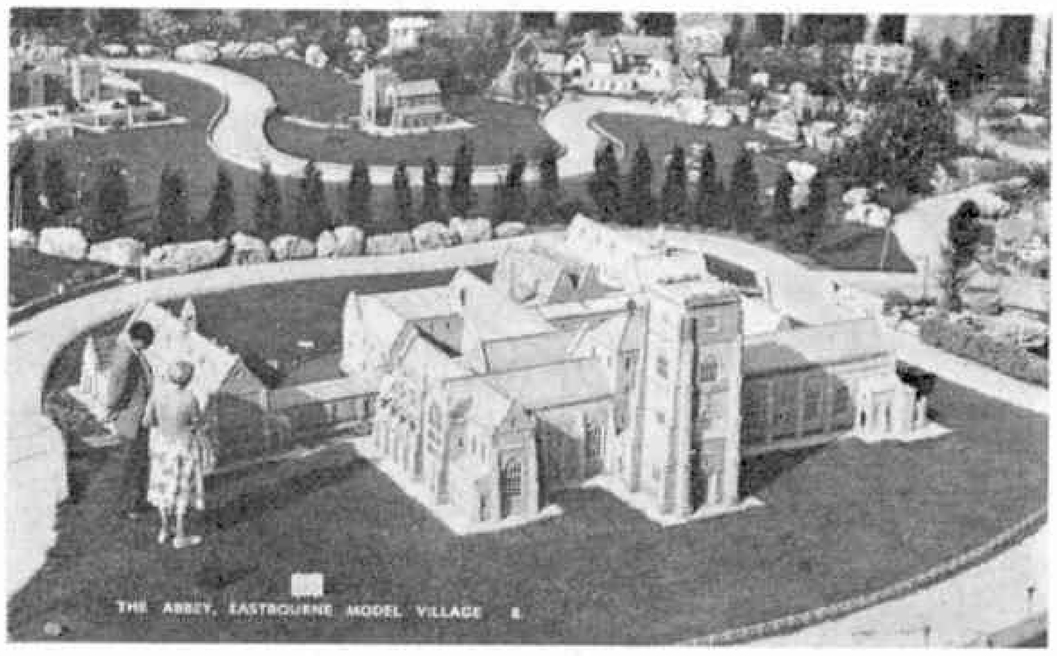
Here also we see the 'massive' medieval fortress of Kingsmere Castle, standing proudly on the far side of the river. Nearby, in well-appointed grounds, is Kingston Agnes Manor, alleged by our guide book to have been built in 1589.

Further exploration will reveal a fine old parish church, a dignified town hall, picturesque old timbered shops, a market cross and a couple of centuries-old inns.

Ramsgate's model village is a beauty spot in miniature. The delightful half-timbered houses are reflected in a winding, gently-flowing stream. A battlemented castle stands watch over the village, and the college cricket team can be seen in action on a velvety stretch of turf running down to the water's edge.

It comes as something of a surprise to discover that this otherwise peaceful village boasts its own airport, complete with modern terminal, runway and a giant (in miniature) four-engined plane standing by to take off on a flight to who-knows-where!

Apart from their value as a tourist attraction, Britain's model villages provide overwhelming proof that fine craftsmanship is still keenly appreciated in this age of mechanisation and mass production.



A group of young boys from the city spend a holiday camping in the Outer Hebrides

THE CALL OF THE ISLES

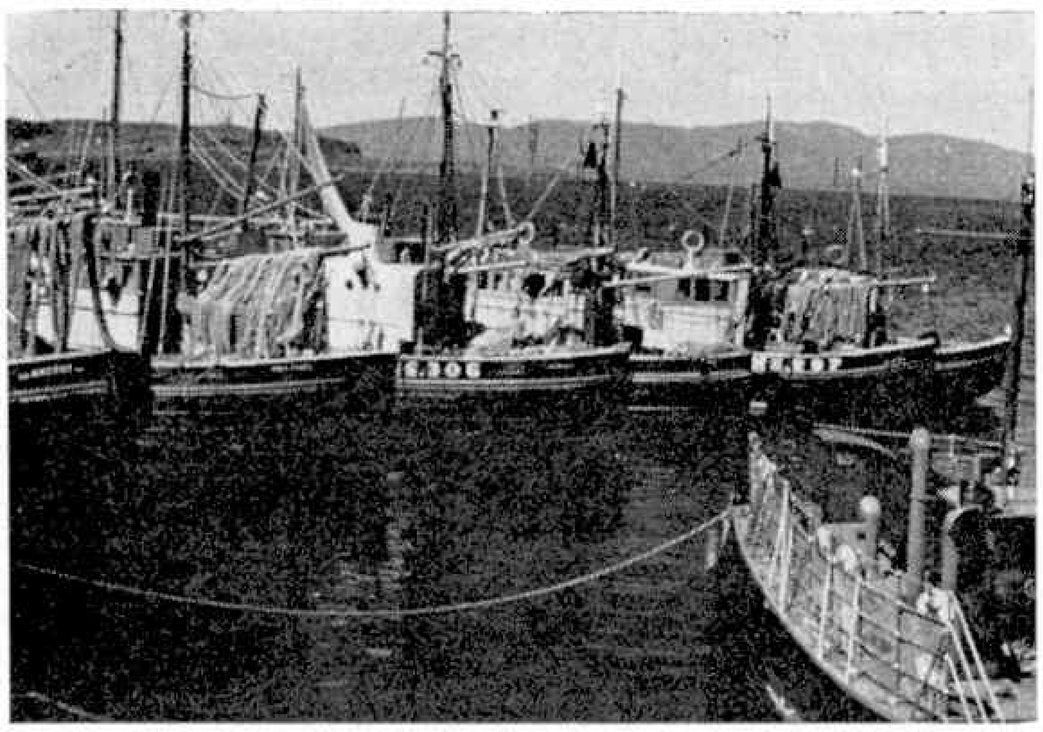
TREVOR M. SMITH

IF MULL is the Queen of the Inner Hebrides, then Iona is the jewel in her crown. So it seemed to six young explorers and their Leader. There was mystery and expectancy in the air as we stood on Pulpit Hill in Oban the night before we sailed. We were being treated to a classic western Highland sunset, and this served to heighten the sense of anticipation for the morrow. The Lismore Light was beginning to wink, Kerrera was a black, island silhouette. An intrepid water skier in Oban harbour beetled his way across a placid bay in the sunset's afterglow as we walked quietly down the hill to our waiting tents. Inside the snugness of our down-filled sleeping bags we took a last look at the sky through the open tent-doors. The stage was set. Our training sessions, I reflected, had been well worth while; we were a team; a keen, fit and eager team, welded by our intent of purposefulness and the skills gained from practice.

We washed away the last vestiges of muzziness with a dip in the stream and after a good breakfast we struck camp and went down to the quay. I had some last minute purchases to make, so we stacked the rucksacks on Oban Pier, arranged a rota of guards for them, and the boys were given time to look at the many and interesting activities going on in the harbour.

Heading photograph: " All aboard for the Isle of Mull ! "

Below: " Fascinating to a town bred boy—Oban Harbour."



The weather was fine but cool, although our spirits were high as we walked up the gangway to board the R.M.S. LOCHEARN. We leaned over the rail and watched the deck hands cast off. The engine-room telegraph clamoured for half ahead with the starboard screw, and the Macbraynes steamer was under way. Then it was full steam ahead, into the Firth of Lorne as we headed past the Lismore Light into the mouth of Loch Linnhe, with its views of many fine peaks.

The boys, town-dwellers all, found it exciting to heave-to in the Sound of Mull, and transfer from the steamer to the small craft which was to put us ashore at Craignure. In the Post Office, the boys despatched coloured postcards to prove arrival on Mull. Whilst in the shop, I was greeted briskly by a man of soldierly bearing. " I'm Maclean," he announced, hand extended. Sir Charles then said he presumed we were the group who had written to him about our intended visit. If we would be at Duart Castle the following morning at 10 a.m. we would be able to look around. I introduced the boys and we parted until next day. It was to the accompaniment of speculative conversation about Duart that we shouldered our rucksacks and did a hot and thirsty trudge to Loch Donhead, where we found a delectable little campsite only yards from the edge of the Loch. Three inflexible rules bound our party together, and it was a point of personal honour and trust to observe them. The first was that whenever we reached a campsite, pitching the tents was always the priority job after taking off one's rucksack; the second was that nobody ever detached himself from the group for any reason whatever without consent of the Leader, and thirdly, no boy was ever to swim unsupervised by the Leader. It was a great temptation to ignore our first rule, so alluringly did the nearby stream-pool invite us. Yet we all had a tacit requirement to observe our own rules, and after first obtaining permission, we established our camp. That there was no manifest resentment pleased me, and perhaps the splash-fight we all enjoyed was enhanced in its fun by our previous taste of self-discipline.

That evening, after the boys were abed, I had a fascinating conversation with a crofter. He had been a forrester in Africa and captivated my attention with his yarns. When I left the croft he gave me fourteen eggs and flatly refused payment. I had heard about Highland hospitality and this was a foretaste of the way

we were to be treated by the Islanders throughout our expedition.

Nine-tenths cloud and showery conditions obliterated all views of the Ben Nevis Massif as we made our way across the Duart Peninsula the following morning. There was a great variety of bird-life to be observed, the Wheatear being one of the commonest species. Our approach to the Castle confirmed our impressions gained from observation aboard the R.M.S. Lochearn in the Sound the previous day. The name Duart is derived from the Gaelic words " dubh " and " Aird " meaning " black height." Duart, we saw, was of traditional square keep design with walls of enormous thickness. There is a well on the ground floor and this part of the castle was used to shelter the cattle in times of attack. The first and second floors were for the soldiers and Laird. Sir Charles took us inside and showed us how the castle had been restored by his grandfather. In the entrance hall was a large window ledge upon which were a number of Scout Camp Pennants which had been sent to the Chief Scout as tokens of loyalty and esteem. Already the 13th Century building was beginning to grip us in its atmosphere, and we ascended a flight of stone stairs to the first floor. Here was a banqueting hall and this led to the lounge. There were several relics including a cannon salvaged from a wrecked galleon in Tobermory Bay, and a huge tripod-mounted pair of binoculars, with Zeiss lenses as big as saucers, that had once been part of the bridge-equipment on a Japanese Battleship. From the lounge we were taken into the Main Hall which contained a billiard table, a huge fireplace and easy chairs. Portraits of the Macleans lined the walls and the swords of past Clan Chieftains accompanied the respective pictures. Above the fireplace hung the Three Flags of the Maclean Regiment; Duart Castle had to be specially consecrated before they could be hung there. The Regiment had been formed in North America. Six rapt and wide-eyed schoolboys listened to the Laird as he recounted how a near-dying Maclean soldier was told by the General who was visiting the hospital that if that soldier recovered he would be granted any reasonable request. Contrary to expectations the man recovered. He reported to the General and reminded him of his promise. The soldier's request was that he be allowed to form a Maclean Regiment; although this was a very unusual plea, permission was granted and the Three Flags at Duart now hang in silent tribute to many a courageous Clansman. After a very impressive visit to the topmost battlements we had even more respect for the builders who had managed to combine cliff-edge strategic ingenuity with views as fine as any in the Highlands; what a truly magnificent family seat ! Lady Maclean thoughtfully provided us with refreshment and then Sir Charles asked us to sign the Castle Visitors' Book before our departure. The boys were engrossed in chatter all the way back, and whisps of conversation drifted back to me about " signing my name in the same Book as the Queen and Duke," and " cor, I bet you can't go on those battlements in a gale " and " wish I had those binoculars " and " I'm going to draw a sketch of that cannon in my Log Book."

Our route to Loch Buie was via Loch Spelve and Loch Uisg and we were lucky enough to see several hooded crows and some splendid heron as well as a variety of gulls. That night a howling South Westerly tugged at our lightweight tents and provided lessons for the boys in the value of choosing a sheltered spot and being careful in pushing one's pegs in at an angle of 45 degrees. The unsettled weather caused us to revise our plan to climb Ben Buie so we decided to explore the northwestern shore of sea Loch Buie as far as

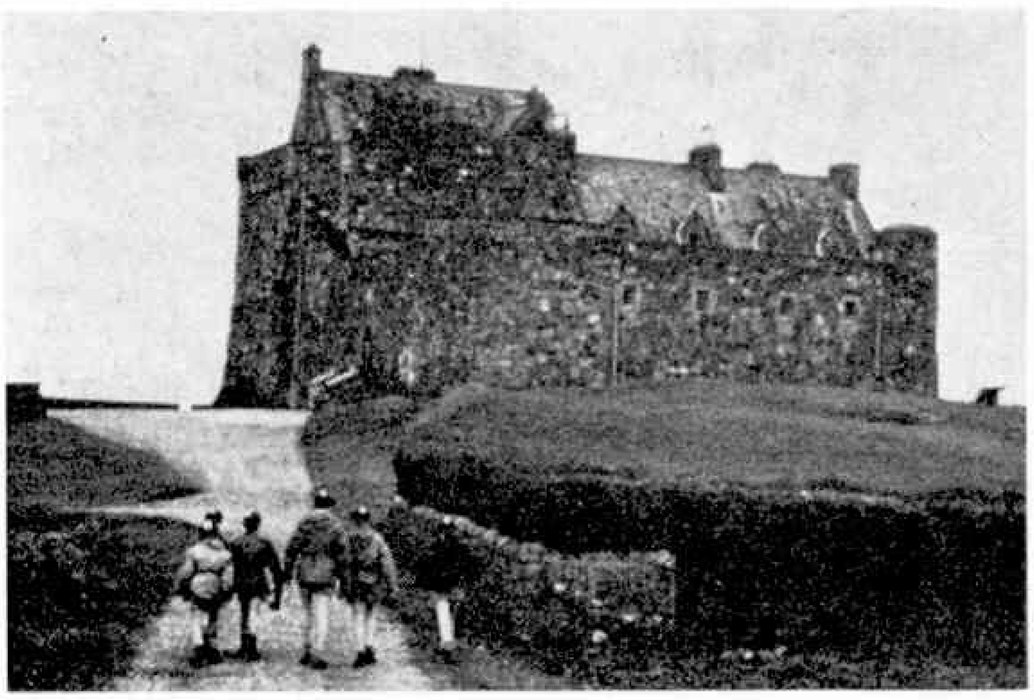
" We've been up there." Beinn Talaidh, Isle of Mull (2,496 ft.)

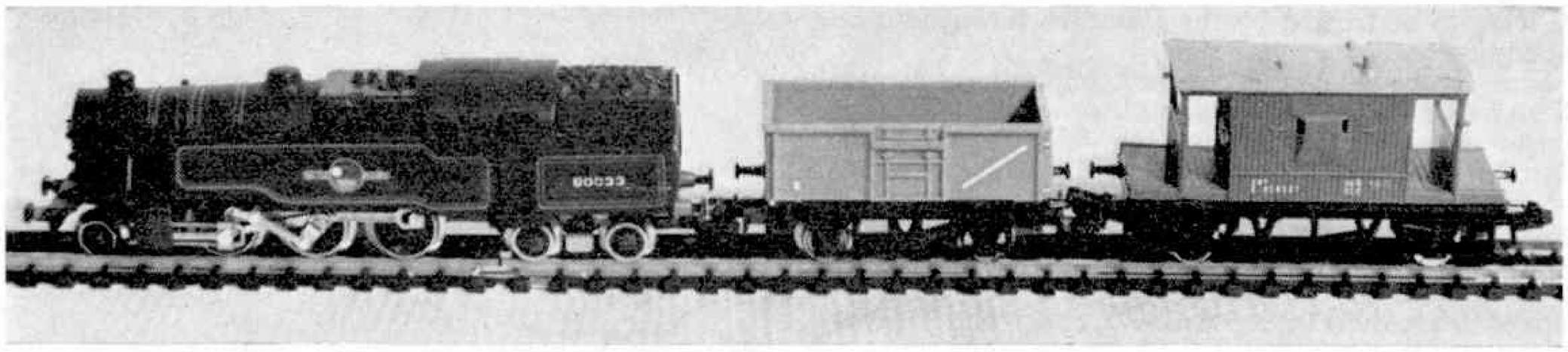
Rubha Dubh. This was a day of squalls and rainbows, of spectacular cliffs and caves, but undoubtedly the find of the day was made by Philip when he came across an oyster catcher chick. We all crowded round to look at this bundle of grey fluff while the parent birds wheeled and swooped with flashes of black and white plumage, their characteristic note piping urgently from the bright orange bills. The birds need not have been so anxious. We were there to learn, observe and admire, and soon carefully left the chick to the ministrations of the parents.

This expedition was being run on lines advocated by John Jackson, Warden of the Snowdonia National Recreation Centre of the Central Council of Physical Recreation. It was on the Mountain Activities Course that I learned the principles of Mountain safety. So when next day we set off to climb Ben Buie, we all carried an emergency ration, a whistle, some first aid, Silva compasses, and an extra pull-over; we all wore boots and anoraks and I carried the relevant one inch to the mile Ordnance Survey Map. In addition I had a length of nylon line in my rucksack. " It could come in handy." It was our first summit. The clouds were high and we looked at the peaks on Mull that we hoped to climb, and also picked the area of our next camp-site in Glen More. We could see Iona, Bac Mhor and Staffa, the Treshnish Islands, the Garvellochs, Scarba, Luing and the Pass of Jura as well as many peaks on the Mainland. That evening we watched the skilful Highland shepherds clipping sheep and then paid a visit to the ruins of Loch Buie Castle.

To be continued

Maclean stronghold. Daunt Castle, Isle of Mull.





BUILDING AN "N" GAUGE LAYOUT

Part II

Construction of the Baseboard

by P. Tomlinson

I hope, in this article, to explain in simple terms a method of baseboard construction that is both efficient and also easy enough for anyone to tackle with confidence. Before talking about this, it might be as well to take note of three rules which, if carried out conscientiously, will save time, temper and trouble.

1. **Measure twice and cut once.** Observance of this elementary rule could save much otherwise wasted wood.
2. **Keep all tools sharp.** Remember that a blunt chisel under pressure is more liable to slip and possibly cause a serious accident.
3. **Take your time.** A sound baseboard is essential to a successful layout. Never be tempted to skimp either materials or work, or after a few weeks you may find trackwork sagging or loose, and your time and money wasted.

The timber required for even an average size baseboard is considerable, and in view of the cost I am certain that anything over 2 in. by 2 in. is unnecessary. A great deal of 2 in. by 1 in. timber can be used, if joints are soundly made and the design and bracing are good. Fig. 1 gives a clear indication of the types of joints most used and you will be able to decide which best meets your needs. Broadly speaking the rule is to use 2 in. by 2 in. for legs and their supports, and 2 in. by 1 in. for cross-rails and top construction.

When buying timber, you will find that prices vary considerably and it will pay you to shop around before buying. Remember that it may be better to deal with someone who sells to the general user, rather than the building trade. Such a dealer may prove helpful in many ways.

Where the top of the baseboard is concerned, you must choose between laying track on lengths of $\frac{1}{2}$ in. thick wood fixed only where the track is to be laid, filling in the other spaces with scenery (known as an open-top baseboard), or completely covering the framework with one of the various possible materials. Personally I prefer the solid top because it is more versatile in that re-laying, enlarging and general improvements can be done with the minimum of disturbance. Such a top also provides a firm anchorage for scenery at any point required. It is virtually essential for a portable layout because it prevents any distortion of the framework after rough handling. Assuming that you decide to build a solid top we can consider the four following recommended materials.

1. *Hardboard.* This is not particularly suitable because of its tendency to warp or twist over unsupported areas. It is the cheapest of all possible materials although this is somewhat offset by the need for additional supports. It will not readily take pins unless a hole is drilled first.
2. *Pulpboard.* Often referred to as Soft Board, this is about $\frac{1}{2}$ in. thick, of soft texture and again requires adequate support. It possesses good sound-deadening properties, but will not hold pins and screws firmly.
3. *Plywood.* $\frac{1}{2}$ in. or $\frac{3}{8}$ in. ply is a most excellent material, but it costs considerably more. On the other hand, only a small amount of support is needed. It is

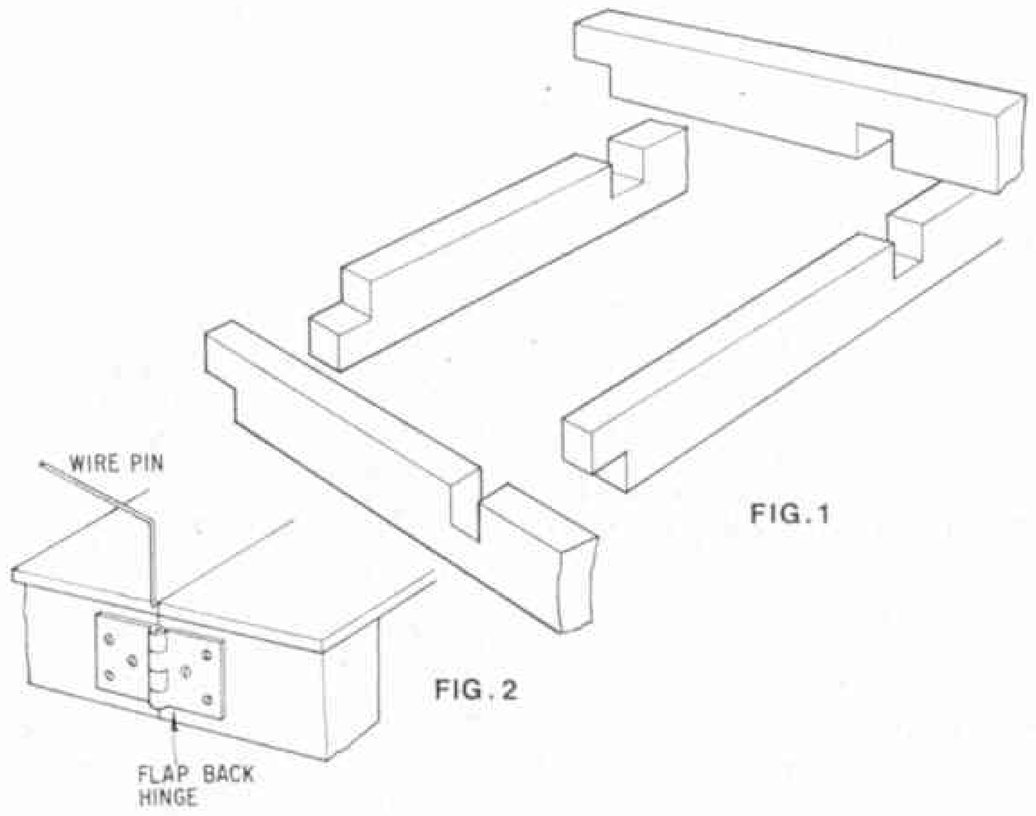


FIG. 1

FIG. 2

extremely rigid and holds pins remarkably well.

4. *Chip Board.* This is probably the best material for most people. It is manufactured from resin bonded wood-chips, about ½ in. thick with very little tendency to warp. This material will take and hold pins easily.

You will have to acquire various tools to work with and, unless you are lucky enough to be able to borrow them, will have to buy them. Good quality tools are better to work with and will certainly outlast cheaper one's, but if you are not expecting to use them for anything more than modelling the cost is not worth it. Cheap tools from a multiple store are quite adequate and in place of a work bench, an old chair will provide a sawing horse, and joints can always be chopped out on the floor.

The size and design of the baseboard obviously depends on the layout plan, but if a portable baseboard is required, the overall dimensions should not exceed four or five feet long by two feet wide. It is however possible to increase these sizes if the baseboard is to be moved occasionally. In any case, unless the layout is to be readily accessible from both sides it is inadvisable to make it any wider than 2 ft. 6 in. because of the awkwardness in handling rolling stock.

On the assumption that you have designed your baseboard and know its size, the first step is to get the timber cut into correct lengths for assembly. A lot of people are frightened by the joints required, and for those who really cannot manage the simple carpentry involved, I would suggest that they borrow or buy a simple mitre box. This is only a channel section of wood with sawcuts at 45 degrees, 90 degrees, and 135 degrees. If the 90 degree one is used, it will ensure that your cuts—either at joints or ends—are really true and at right-angles, and will also make sawing a much easier proposition. For a number of identically sized lengths of wood, the mitre box can be used as a jig to cut all the lengths at the same time, thus ensuring dead accuracy and squareness. Having cut the sides and cross-members to length, the next step is to join them together, and this can be done in many ways, ranging from a simple screwed butt joint to the intricate dovetail. Fortunately there is no need for the latter, but there is no doubt that a simple half-joint is much stronger than a butt joint. The two joints shown in Fig. 1 are easy to make, but care must be taken when cutting to obtain a tight fit.

Cutting of the joints is carried out by starting with two pieces of timber cut to length for the sides, clamped together face-to-face, bringing the two 1 in. widths together. Do your marking out on these with a steel rule and a square and remember when measuring, that your timber will be planed and therefore about ⅛ in. less in thickness, i.e. ⅞ in. by 1⅞ in. First mark out the joints for your end members, then bearing in mind the type of material you are using to cover the framework, space your cross-members equally between the two ends. Check your measurements again before unclamping, then square your markings across the side and down the opposite 2 in. faces. If you are using the joint shown in Fig. 1, the depth should be half the thickness of the timber, i.e. $\frac{15}{16}$ in.

The next step is to saw down the sides of the joints with a fine tenon saw, cutting just inside the pencil mark to allow for the width of the saw teeth. It is better to err on the side of tightness, as this can obviously be corrected. The efficiency of a loose joint is practically nil. Work the waste wood out of the slots with a sharp chisel, a small amount at a time, with a series of sharp taps with a mallet, gradually working down to the line. Clean out with the chisel only.

Repeat the above procedure with the cross-members, then lay one side member on the floor and with a mallet tap the cross-members home. Lay the other side in position and repeat the operation. If your work has been even reasonably accurate, you should be able to move the framework about without danger of collapse. Before screwing the parts together, test for squareness by measuring diagonally from one corner to the opposite, checking with the other two corners. Any deviation should be corrected by gentle tapping until true squareness is obtained.

The art of getting screws easily but firmly into wood, lies in correct drilling. A hole the length and diameter of the plain part of the screw shank is drilled first, followed by a finer one to pilot the screw in, and finally a countersink is used to enable the head to drop down to the surface level of the timber. Dip the ends of the screws in grease to prevent rusting, and to help you to withdraw easily should the occasion arise. Drive the screws firmly home and lay the completed framework upon the sheet of covering material and mark round with a pencil. Cut just outside the mark and plane the surplus flush after fixing with screws. Your baseboard top is now complete.

Use 2 in. by 2 in. timber for legs, with 2 in. by 1 in. cross and diagonal bracing rails. In order to allow for the bracing stays, the overall width of the legs should be 1¾ in. less than the inside width of the top, as this allows the diagonal stays to be secured to the outside of the legs and the inside of the baseboard framework top. Unless neatness is important, it is not necessary to cut joints in the legs for the cross-bracing. Sufficient rigidity will result by screwing the braces direct to the legs, making quite certain that the assembly is square.

Continued on page 411

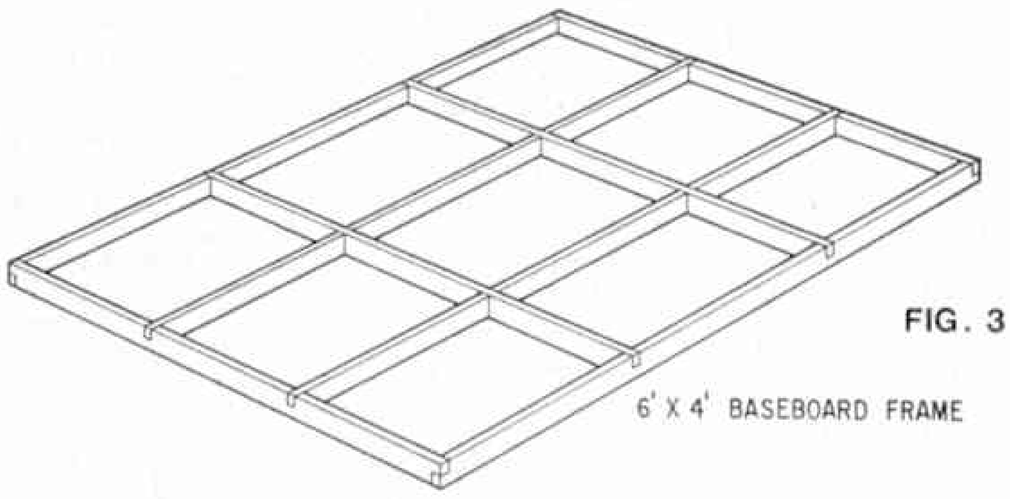
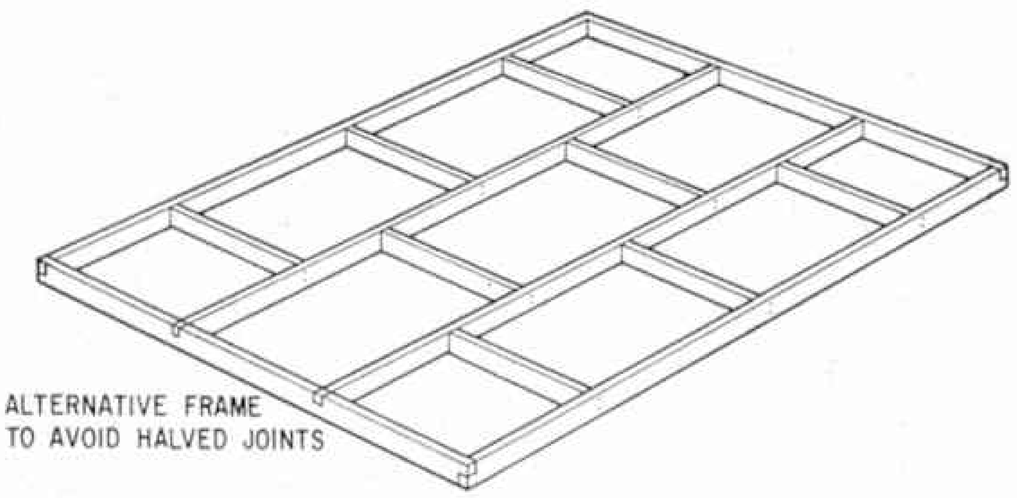


FIG. 3

6' X 4' BASEBOARD FRAME



ALTERNATIVE FRAME
TO AVOID HALVED JOINTS

TRANSPORT TOPICS

by

Mike Rickett

ALTHOUGH FAMOUS for commercial vehicles of practically every kind, the British Leyland Motor Corporation also have something of a reputation for the manufacture of buses. In fact, they are the acknowledged leaders in this field and countries all over the world have used Leyland bus chassis to form the basis of their fleets. Australia particularly, has several capital cities with extensive fleets of Leyland vehicles modified to suit the particular transport need.

In Adelaide, for example, they have found that a three-door single deck bus is ideal for their traffic conditions and this has become the basis for their standard bus, and is a design that has prevailed over the last sixteen years. Buses subsequently added to the fleet have incorporated technical improvements, but all have included a double door at the rear and provided capacity for forty passengers seated, and fifty standing. At present, the Adelaide Municipal Tramways Trust has a fleet of 325 buses, consisting of 56 AEC Regal Mark IV units which entered service between 1954 and 1955, and a further 70 AEC Regal Mark IV buses which were added in 1956 and 1957. More AEC Regal Mark VI buses were added in 1963 with a crush load of 87 passengers. The largest single batch of buses however consisted of 196 Leyland Royal Tiger Worldmasters introduced between 1957 and 1958.

Chassis for all these were made by the British Leyland Group and the bodies were made locally by Freighter Industries Pty. Ltd. In Brisbane, the sub-tropical capital of Queensland, municipal transport also includes trams and trolley-buses, although they are both undergoing conversion to bus operation and it is thought that tram operation will end later this year. At present, Brisbane's bus fleet consists of 115 Leylands, made up of Royal Tigers, Royal Tiger Cubs, Worldmasters, Leopards and Panthers, 36 Albion CX13's, 177 AEC of Regal Mark II, III and IV types, as well as Reliance models, and also 32 Daimlers of the CVD and CVG types. Brisbane Corporation is also taking delivery of 340 Leyland Panther buses which will replace a number of older ones and which will also replace the trams and trolley buses. The capacity of these new buses is 82 passengers, made up of 39 seated and 43 standing. Coinciding with the change-over from tram operation the City Council have devised the attractive new livery of Zenith blue with a band of Arluen Blue along the side with the roof finished in arctic white. The City Coat of Arms appears over the front wheels.

One of the most planned cities of Australia is the Federal Capital of Canberra, where even the smallest shrub conforms to an exact and intricate pattern. Streets in the centre of the City are designed on a crescent pattern around a lake positioned in the centre and really modern roads give easy access to all suburbs. Passenger transport is operated entirely by buses and the routes have been decided at the planning stage by the Department of the Interior, Transport Section. They currently operate 100 AEC Reliance and 10 Leyland Leopard buses, and the Department are also taking delivery of four AEC Swift chassis, with another ten on order. Throughout Australia, emphasis is placed on suiting the type of vehicle to the nature of the City concerned. It does however reflect on the know-how and ability of British Leyland that their vehicles find such extensive use in both

every important city in Australia, and many other important transport undertakings throughout the world.

More than just an efficient bus service is needed in our own West Country during the Summer months however. Normally, queues of traffic cause considerable delays. Now however, British Rail have devised a "leapfrog" scheme to help motorists over West Country traffic jams. This scheme is to run this summer between Bristol and Newton Abbot, Devon, and it is designed to help motorists avoid the notorious Exeter by-pass. On Saturdays, between June 14 and September 6, car-carrying vehicles are to be added to two passenger trains each way—the 8.10 and 10.30 from Bristol and the 12.15 and 16.03 from Newton Abbot.

A British Rail Western Region spokesman said about the new plan, "The decision to add car-carrying vehicles to these services follows an experimental service of one train in each direction during 1968 between Bristol and Totnes, eight miles from Newton Abbot. The new services are designed to help motorists from the Midlands and North heading for resorts in the West to avoid the Exeter by-pass and other bottlenecks. Bristol lies at the southern end of the M5 and this makes it accessible to motorists from the Midlands, Lancashire and Yorkshire.

Talking of Lancashire, if you should by any chance be in the county on July 26, I would suggest a visit to the B.R. Open Day due to be held at Allerton, Liverpool, where No. 7029 "Clun Castle" can be seen in steam. Also on view will be electric and diesel locomotives and modern items of rolling stock. Visitors will also be able to walk through a special exhibition train showing the latest developments in track maintenance, signalling, telecommunications and other railway equipment. A cinema coach will, in addition, be giving free film shows throughout the day. Similar open days will be held at Cricklewood near London on July 12, and at Tyseley, Birmingham on September 28.

Finally, visitors to Scotland this year have the opportunity of buying the freedom of British Rail, the Clyde and Loch Lomond ships, and the Sky Ferries, for as little as 16/6d. a day

Special tickets issued by B.R. enable visitors to go where they like, when they like, in Scotland's 30,411 square miles. The holiday maker is never more than 40 miles from the sea or far from glorious scenery, mountainside or glen, and with the unlimited travel possible with these tickets, travelling round Scotland becomes an attractive idea.

Above right: Most Australian buses are one-man-operated, like the one illustrated here at work in Perth.

Above: Notice that all Leyland buses in Australia have three doors on one side.

Right: A Leyland Worldmaster bus, at work in Adelaide.

GREAT ENGINEERS—No.19

LORD NUFFIELD

by A. W. NEAL

IN THE course of his active life, Lord Nuffield attained a position of great prominence and wealth. The outstanding feature of his personality may be expressed in one word—' enterprise.' His active life corresponded with a time of unprecedented progress, requiring fresh thought and new methods. He saw these needs and acted accordingly.

He was born William Richard Morris at Worcester, and was the first child of seven of Frederick Morris. The family moved to Cowley, Oxford, William receiving his education at the Church School there. His formal education ceased at the age of 14 when he took employment with a local cycle repairer. After a short period he asked for a shilling a week rise, which was refused. He thereupon walked out to set up business in the same line, his capital being £4 total.

His little business thrived, and he was fortunate enough to secure a contract with the Oxford Post Office to repair the postal cycles. At the age of 16 he was building cycles. Just about the turn of the century Joe Cooper came into the business as a partner, and between them the concern expanded further. But Morris began to take a lively interest in mechanically propelled vehicles and it seems that Cooper did not take kindly to exploring the prospects of these. Consequently the partnership was dissolved with no hard feelings. Morris went ahead with his schemes and the first motor-cycle was built in 1901. He took another partner and commenced trading as the Oxford Automobile and Cycle Agency, with three shops in Oxford, one in Abingdon and another at Bister. By 1904 the sun had ceased to shine and the Agency ended.

Morris, ever resilient, started along the same path again. Within a few months he was making cycles in a small workshop in James Street. But cycles were now not enough for Morris and, although he was buying and selling motorcars, he seriously looked towards manufacturing them. And so it came about that 1913 saw the first Morris-Oxford car, designed and built almost entirely by himself. Two years later it was in production. His system was to contract out for the parts. Wheels were made here, engines there, bodywork somewhere else, and it was more the management of the whole that led to his success.

During the 1914-18 War the works were turned over to war-time production, and he was rightly proud of his share in this field.

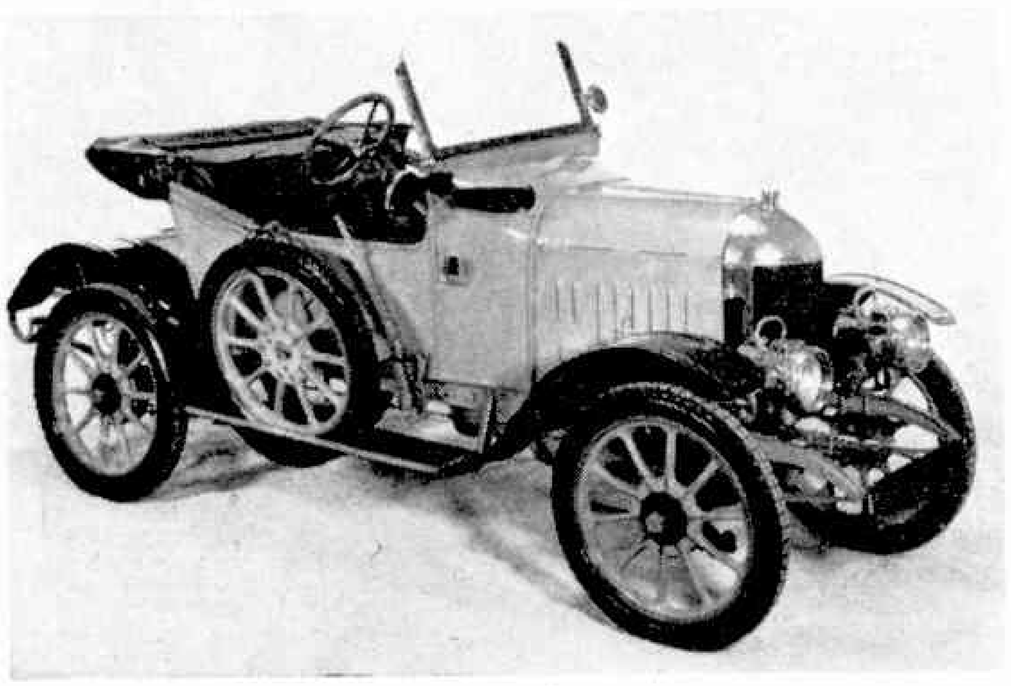
In the year 1924, Morris turned out slightly less than a quarter of the car production of the country, and in the following years just over a third of the production. By then he owned a body-building works, a metal stamping works, a radiator factory, another for the production of engines, and yet another for the manufacture of carburetters. The Cowley plant assembled these and turned out the finished product. His works at Abingdon produced the small and fast famous M.G. sports car.

Morris said ' It was the most thrilling hour of my life ' when he bought Wolseley's for £730,000, with his own money. That was in 1926.

During the second World War the Morris organisation was turned over to the manufacture of tanks, bren-gun carriers, petrol cans, midget submarines and torpedoes, the repair of aircraft and so on, as well as cars. The works turned out Oxford Vaporizers for anaesthetics under combat conditions, and this may have been responsible for Morris's later great interest in hospital work.

William Richard Morris was awarded the O.B.E. in 1917, created Baronet in 1929, Baron in 1934, and first Viscount Nuffield of Nuffield in 1938, and G.B.E. in 1941. He was appointed Deputy-Lieutenant of Oxfordshire in 1943. He was a Governor or Vice-President of many hospitals before they were taken over by the State, and it is estimated that he contributed about £30 million of his own personal furtune to charity, education, medicine, and research. He was an Honorary Freeman of Coventry, Worcester, Cardiff, Droitwich, Oxford, and Whitehaven, and an honorary member of many societies and organisations. He retired from active participation in industry in 1952 and was in that year appointed Honorary President of the then newly formed British Motor Corporation.

Oxford has had many great men, but none whom the city more delights to honour than this man who started from nothing and ended in riches. He was more a practical engineer than a technologist.



1913 Bull Nose Morris Oxford.

ON TWO WHEELS

Above: Our young rider is adequately protected against the weather or a spill! The helmet is the latest type from " Everoak "; the suit a Commuter Coverall. The machine is the subject of our first review next month. Anyone care to guess what it is?

Below: A group of learner drivers undergoing expert tuition on the RAC/ACU training scheme. *Photo courtesy of the Royal Automobile Club.*

The ambition of most youngsters, upon reaching the age of sixteen, is to own a motor cycle, scooter or moped. Starting in the September issue, we will be running a series of articles on the most popular machines that fall into these three groups, that are currently available on the market. These will be supplied by various manufacturers to be photographed and road tested by " Meccano Magazine " staff, helped by a few enthusiasts with the necessary experience to carry out the task; all helping to ensure that each report will be both accurate and fair. If you are a would-be rider, and would like to see a particular machine included in the series, write a short letter to the Editor, and wherever possible an effort will be made to include it in a future article.

What to choose

WE IN Great Britain are very fortunate in having a tremendous range of two wheelers, from all over the world to choose from; however this can create problems, at times we are in fact, literally spoilt for choice. It narrows down the field considerably of course if you know which type of transport you prefer, and also if you know how much you are prepared to spend. Mopeds are generally the cheapest of the three, scooters next, and motor cycles the most expensive. However, perhaps the most important factor to be considered is what do you intend to use your machine for. To help you decide this point it is essential that you know the limitations of each, and here is a short description of each type which should go a long way towards helping you reach this decision.

Mopeds

These are with very few exceptions the lowest powered of all. They can be fitted with engines as low as 32 ccs, and at best 49 ccs. The majority these days are of the latter capacity. In appearance they look very much like sophisticated bicycles and are always fitted with pedals. This point, incidentally is the dividing line between mopeds and light motor cycles. Most of the cheaper types have only one gear, and are fitted with just one seat. The more sophisticated types have up to 4 gears, and are often fitted with a dual seat and passenger footrests. They cost between £50 and £90, but there are of course the odd exceptions. Referring to the pedals again, these are used to start the engine, very much like a motor cycle kick-starter in fact, although the need to use them to assist the engine once the machine is running is rare, especially with the types fitted with gears. Some to-day are fully automatic and are as simple to ride as a bicycle.

Due to their comparatively small engines, speeds of over 40 m.p.h. are rare, and they are not suited for long journeys. They are the cheapest to run (often over 180 miles to a gallon !) to tax (£2 10s. 0d.) and insurance (as little as 30s.). All the current types are powered by two-stroke engines.

Scooters

The scooter is a comparative newcomer to the world of two-wheelers, and was only accepted as a serious means of travel during the mid 1950's.

The sizes of engines range from 50 ccs to 200 ccs, although once again, there are the odd exceptions. Their main advantage over moped and motor cycle, is protection against the elements. The majority are fitted with 3 or 4 speed gearboxes and like the mopeds, all are powered by two stroke engines. The smaller types are suitable only for local journeys, but those of 150 ccs and upwards are capable of touring. Top speeds vary between 40 and 70 m.p.h. Contrary to popular belief, scooters are *not* dangerous because they have small wheels. Insurance, although higher than

mopeds, is still very cheap, around the £4 mark is average. Tax depends on engine capacity—up to 150 ccs £2 10s. 0d. 150 ccs upwards £5.

Motor cycles

These are the most popular choice for "getting-around" and the range at present is very large indeed. During the last few years, the Japanese have been importing very sophisticated machines, fitted with electric self starters and flashing direction indicators. Engines used are both two stroke and four stroke, single or twin cylinders. Engine capacities range from approximately 100 ccs to 850 ccs (once again there are exceptions). Learner riders can only use machines up to 250 ccs capacity. All are suitable for touring and generally top speeds vary between 60 m.p.h. and 90 m.p.h. Insurance varies a great deal, depending on age, experience and size of machine, although it is nowhere near the figure required to insure a car. Tax is by engine capacity. 150 ccs to 250 ccs £5, 250 ccs upwards £10.

New or secondhand

It is of course preferable to buy a new machine, but unfortunately this is not always possible. If you are forced, as most youngsters are, to buy a used machine, take someone with you who has a knowledge of two-wheelers, and be guided by them. We cannot attempt to list "do's and don't's" in this article, as it would consume too much space. If you buy from a dealer, try to get a guarantee. Repairs can be very costly.

What to wear

To be caught on the open road in a rain storm, dressed only in ordinary clothes is pretty bad, but on a two-wheeler, to say you are in for a soaking is putting it mildly. Imagine driving at 30 m.p.h. into driving rain and you will understand what we mean ! The rain goes straight through ordinary clothes very quickly and you can soon be absolutely soaked. On a more sober note, a spill on a gravel road can ruin your suit (not to mention your skin) very easily. This brings us to a rather serious point worthy of note. Never, no matter how warm the day might be, ride your machine in shorts, and just a shirt. It might feel nice to have the wind cooling you down, but if you were to fall off your skin is no substitute for a good strong jacket ! It goes without saying that you should always wear a crash helmet of one kind or another.

If you own a moped or scooter you will need lighter gear than if you ride a large motor cycle and intend travelling long distances. In the photograph we illustrate an ideal lightweight suit which weighs a mere 12 ozs and costs approx £7. It's completely wind and waterproof and the bottoms of the legs are designed to fit over the toecaps of your shoes, this preventing water from running down your legs and through your socks. Our unlucky test rider went out in a rain storm to prove this point ! You just put it on over your ordinary clothes and can arrive at your destination none the worse for wear.

If you ride a large motor cycle, due to the higher speeds reached, you will probably need something rather stronger and warmer. There is an immense range of motor cycle gear available and your local shops should help on the point. Crash helmets, as we said earlier are a must. Only a fool will ride around without one. We were guided in our choice by Messrs. Everitt W. Vero & Co. Ltd., producer of the "Everoak range," and settled for a white one (shows up at night) of the space-helmet variety (protects the temples as well as the skull). If you are unfortunate enough to have a spill and your crash helmet takes a wallop buy a new one. This is common sense when you think about it. You could have cracked it on impact, even though it may seem O.K., and your next spill (if you're unlucky to have another !) could see your helmet break up and leave your head to take a knock.

A Police Motor Cyclist gives a young learner some advice.
Photo courtesy of the Royal Automobile Club.

Gauntlets, or gloves are a sound buy. Apart from keeping your hands dry and warm they will prevent you from scraping your fingers if you fall off. Always make sure that, apart from your face all areas of skin are protected. You have all probably heard stones thrown up by the car in front bouncing off your Dad's car. Imagine one hitting your leg !

Last but not least, goggles or perspex visor are a good buy, and prevent insects etc. from getting in your eyes. Once again the range is very large, and a visit to your local shop is the best advice we can give.

How do you learn ?

Learning to drive a car is pretty straight forward. The learner jumps in the driving seat, and the instructor sits beside him. On a two-wheeler, this of course is impossible. By far and away the best means of learning to ride is to go to an organised school and be taught by experts.

The largest, and certainly one of the best is the course provided by the R.A.C. (Royal Automobile Club) in conjunction with the A.C.U. (Auto Cycle Union) called appropriately enough "The RAC/ACU Training Scheme. Briefly the course (which costs approximately 1s. 6d. to 2s. a lesson) provides 24 hourly lessons, 12 of which are devoted to practical riding. They cover thoroughly every aspect the learner rider needs to know. It isn't necessary to own a machine to learn how to ride, although it is obviously preferable. There are at present no less than 170 training centres throughout the country, which should enable most riders to find one in their area. For further details, write to:—

The National Organiser,
RAC/ACU Training Scheme,
83/85 Pall Mall, London S.W.1.

AIR NEWS

John W. R. Taylor describes :

Aircraft
Hot-air Balloons

Airliners of AD 2000

IN A recent lecture in Moscow, Alexei Tupolev predicted that airliners will fly at 7,000 to 10,000 kilometres per hour (4,350-6,200 m.p.h.) by the end of this century, and will take little more than two hours to reach any point on the globe. He should know what he is talking about, being the designer of Russia's first supersonic airliner, the Tu-144, and son of that nation's greatest-ever designer, 80-year-old Andrei Tupolev.

The main reason for wanting to fly at such speeds, he explained, is that passengers find long-distance air travel tiring and boring and want to reach their destination as quickly as possible. To cope with increasing traffic, he believes that airliners of the year 2,000 will each carry up to 1,000 passengers in individual armchairs, with a TV screen at every seat and high-speed cabin service with, perhaps, robots replacing air hostesses.

Not all airliners of the future will be supersonic, according to Tupolev. Many routes are too short to permit acceleration to high speeds before it is time to begin the landing approach. In these cases, journey time will be reduced by using vertical take-off aircraft able to operate from pads in or near city centres.

Heading photo shows the Douglas Dolphin " ROVER ", the oldest Aircraft still in Service.
Below: The BN-3 NYMPH, a " Build-it-yourself " aircraft.

The man who bought " Brand X "

Did Mr. Dunlop ever buy a tyre from Mr. Goodyear, or Henry Ford go shopping for an Austin or Vauxhall ? Of course not—any more than William Boeing would have bought an aeroplane from his great rival Donald Douglas. . . . But, wait a minute . . . what about the little Douglas Dolphin amphibian NC14205 ?

Far from being embarrassed by such a question, the publicity staff at Boeing were quite happy to tell me the full story of NC14205 *and* dig out some photographs of it from their archives.

It seems that back in 1928 Mr. Boeing bought a Boeing Model 204 seaplane for his personal use. It was a sturdy little machine, but had been developed from a much earlier design and was a bit limited in speed, range and carrying capacity. So, in 1934, he decided to buy a larger 'plane to act as tender for his yacht.

Unfortunately, his own company was not building flying-boats at the time, whereas the Douglas Aircraft Company was offering a very nice little twin-engined amphibian called the Dolphin, which cruised at a respectable 110 m.p.h., had a range of 600 miles and carried up to 12 passengers. There was no alternative to " Brand X," and Boeing was soon the owner of NC14205, the sixth Dolphin off the line. He named it *Rover* and used it throughout most of the 'thirties.

In 1940 or 1941, Mr. Boeing sold the little amphibian, which was eventually taken over by the Civil Aeronautics Administration for wartime operations in Alaska. Since the war, it has done all kinds of jobs. After serving as an aerial sightseeing " bus " in the San Francisco area, it was leased to Catalina Channel Airlines and then sold to John Martin, an ex-Hollywood actor and former World War 2 B-29 bomber pilot.

Mr. Martin and two colleagues intended to fly the Dolphin to Dominica in the West Indies, to start a charter service; but it had got no further than Miami when last seen. Whatever happens next, there seems little doubt that Bill Boeing's old *Rover*, now re-registered N26K, is the oldest Douglas aeroplane still in service. Need I add that Boeing ascribe this amazing longevity to the excellent maintenance it got while owned by their late boss !

Britten backs Britain

Since the war, Britain's aircraft industry has produced many of the world's finest combat aircraft and airliners. It built the first jet airliner, the first turboprop airliner, the first 1,000-m.p.h. record-breaker, the first vertical take-off fighter and many other great aircraft; but it has never regained the place in the lightplane market that it held pre-war with the de Havilland Moth family.

BAC and Hawker Siddeley are capable of producing very good light aircraft, just as Rolls-Royce could probably turn out world-beating " minis " if they wanted to do so; but, again like Rolls-Royce, they have more important things to do. Beagle have developed some efficient lightplanes, but seem unable to break into the world market which is now dominated by US manufacturers.

Beech, Cessna and Piper alone produce some 12,000 single-engine lightplanes each year, of which 25 per cent are exported, many of them to Britain. How can any newcomer hope to compete with them ? Down in the Isle of Wight, Britten-Norman Ltd. believe they have the answer.

Early this year, they began work on the prototype of a neat all-metal four-seat lightplane named the BN-3 Nymph. Only 53 days later, on 17 May, the prototype made its first flight, piloted by Desmond Norman, one of the two young businessmen who founded the company. He was accompanied by his fellow director, John Britten, and a flight engineer.

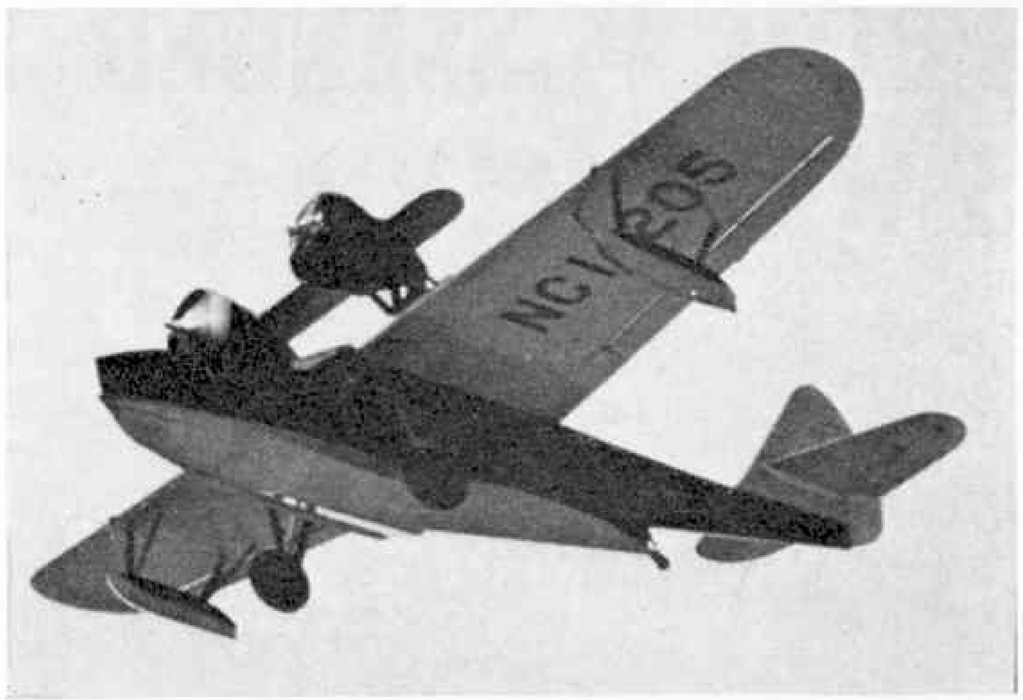
The Nymph was such a winner from the start that within a few days Britten-Norman were ready to announce their revolutionary plans for marketing it. Taking a lesson from the car industry, they intend to export Nymphs in the form of completely " knocked down " kits of finished parts for assembly under licence overseas. This has many advantages. They do not need to set up a costly final assembly line: the customer does not have to pay heavy shipping charges and has the opportunity of starting a local aircraft industry in places where none exists at present, without any of the worry of having to design or develop his own aircraft or even build the parts for them.

Britten-Norman believe that a completed Nymph will cost their licencees anything from 25 to 50 per cent less than a comparable aircraft imported from America. Having already achieved fantastic success with their ten-seat twin-engined BN-2 Islander, for which they have obtained orders worth £9 million, Britten-Norman appear to be a company with a very bright future.

Hot-air balloons to the rescue

Taking a balloon ride over enemy territory might not be everyone's idea of flying with a future, but USAF pilots forced to bail out of their aircraft may one day have reason to be grateful for a revival of the ancient art of hot-air ballooning.

An escape system, known as the **P**ilot **A**irborne **R**ecovery **D**evice (PARD) is being developed for the Air Force by the Goodyear Aerospace Corporation at Akron, Ohio. After an airman ejects from his disabled 'plane, his main parachute will open as normal. But then, at his discretion, he can initiate the PARD system. A ballute (contraction of balloon parachute), attached to the top of the main 'chute, is inflated as air rushes through its vents. A burner, suspended below the ballute and fed from a tank of propane gas strapped to the pilot's back, ignites. This forces hot air into the ballute, raising the temperature to 250 degrees Fahrenheit, giving it sufficient " lift " to halt the airman's descent and to take him up and away, well above the range of enemy small arms fire.

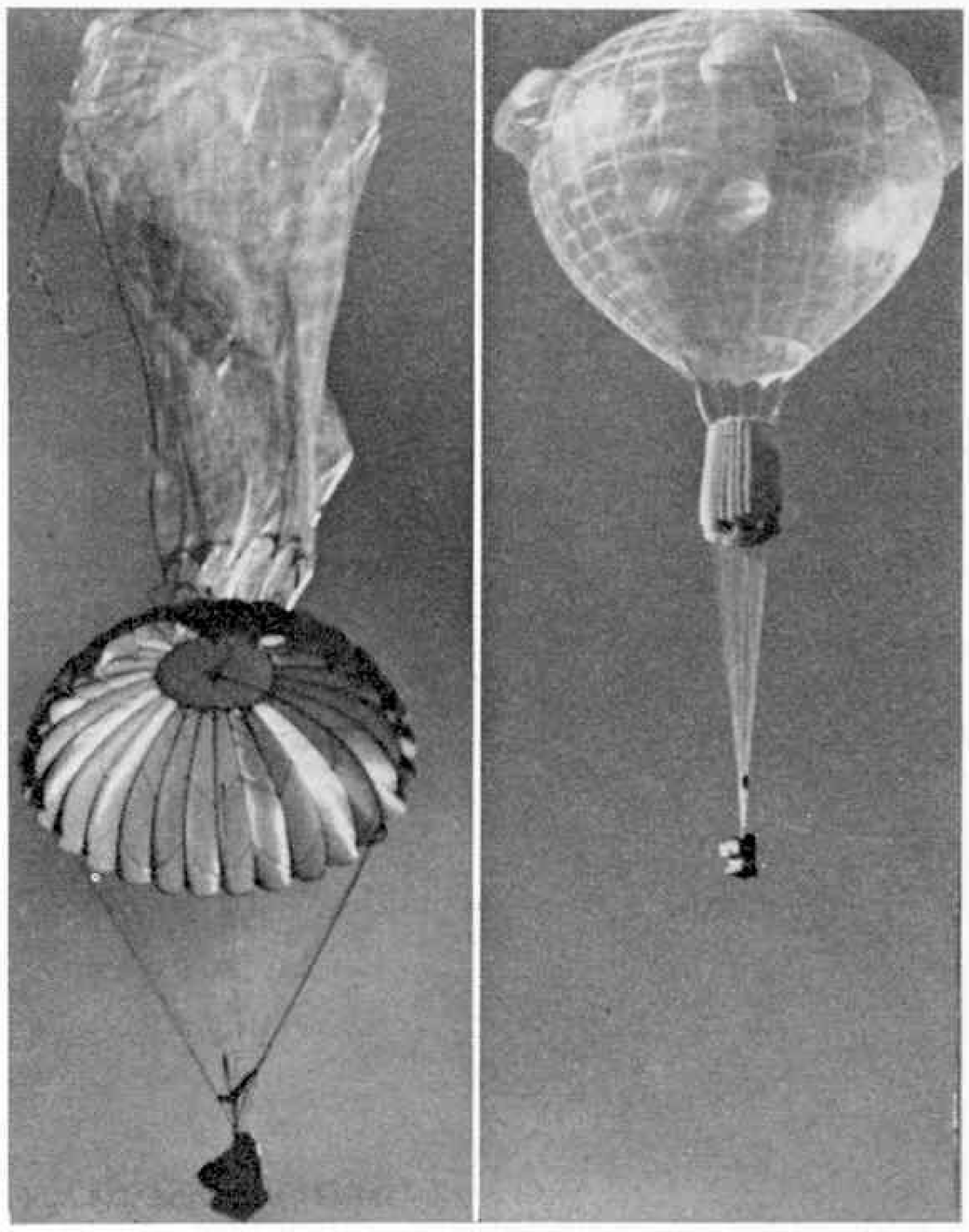


In its Boeing colours, " ROVER " was used as a tender for Mr. Boeing's yacht.

The hot air in the ballute will keep him aloft for 30 minutes, long enough for an Air Force rescue aircraft to locate him by means of a radio signal transmitted from the PARD system. The rescue craft can then snatch-up the pilot in mid-air and reel him into the aircraft, or tow him to an area where he can make a normal parachute descent.

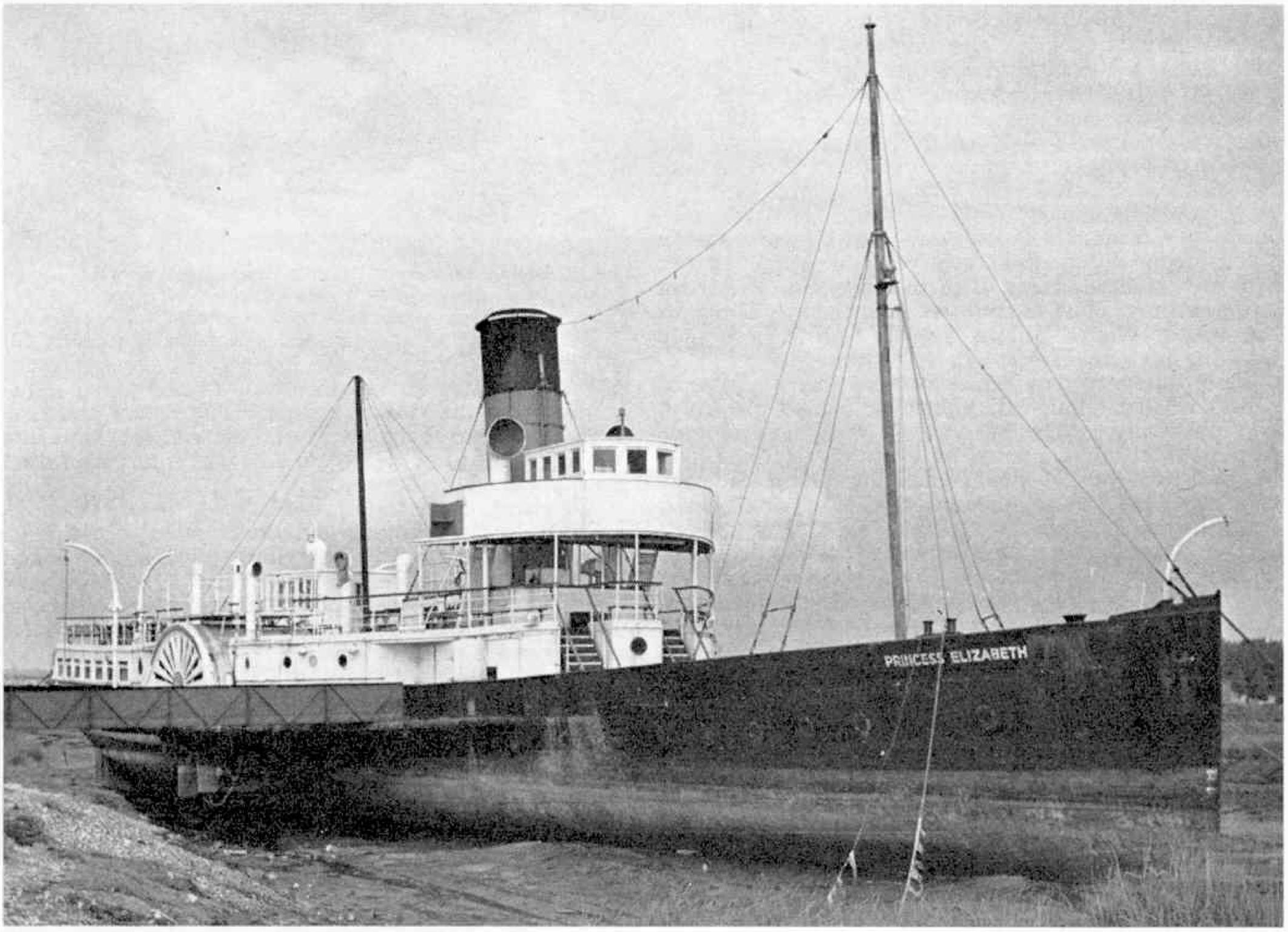
Weighing only 50 lb., exclusive of the parachute, PARD also incorporates a built-in safety device that allows for automatic operation if the pilot is disabled and is pre-set to carry him to 6,000 feet. It can also be operated manually to increase the hovering height to 10,000 feet. Tests of the system with a dummy have already proved successful.

The hot-air balloon " PARD " assisted parachute device has in the left photo just been released. On the right it is shown in its final shape.



FROM PASSENGER SERVICE TO YACHT MARINA

by E. Harper



IN 1927, the steel-hulled paddle steamer "Princess Elizabeth", weighing 371 tons, was built at Northam, Southampton, to be used on the Red Funnel steamer service between the port and Cowes. Each summer the gay, sturdy little vessel carried cargoes of happy holiday makers round the Isle of Wight coast. The Red Funnel Company was known then as the "Southampton, Isle of Wight and South of England Royal Mail Steam Packet Co. Ltd." formed in 1861.

War came and the 'Princess Elizabeth', taken over by the Royal Navy, found herself carrying weary men back from Dunkirk. In 1940 she made four trips from Margate to the Dunkirk beaches, rescueing about 1,700 men of whom 380 were French. On her fifth attempt, she found the Germans in occupation and according to one of the crew 'beat a hasty retreat'. For the rest of the war she served as a mine-sweeper. Five of her crew received awards. The D.S.C. went to Lieut. Carp and Ty/s Lieut. J. Tomkin both R.N.V.R. while Petty Officer Coalbran, Sig. Savidge R.N.V.R. and Fireman Stoker Baker received the D.S.M.

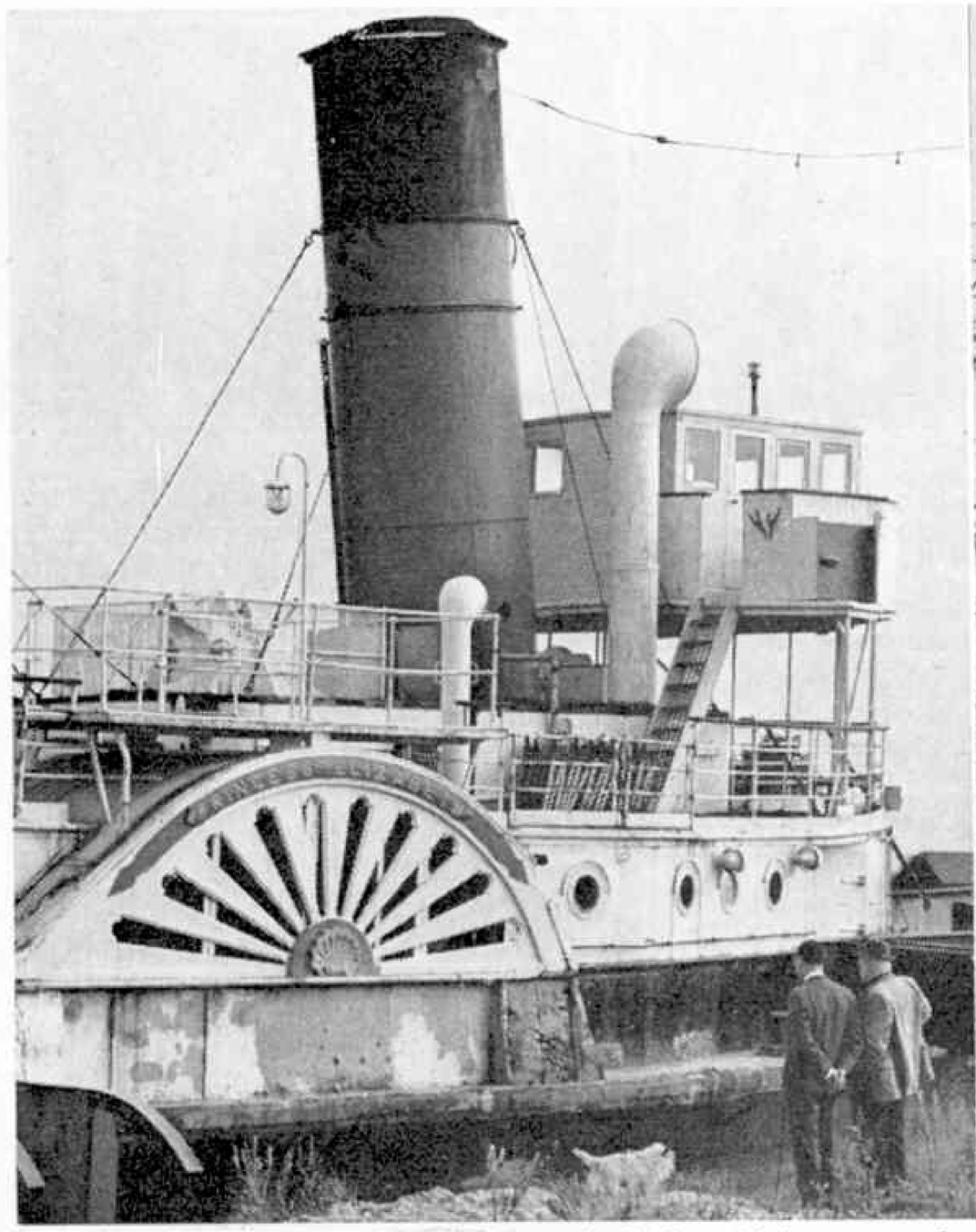
1946 saw the 'Princess Elizabeth' being converted from coal to oil firing in Camper Nicholson's yard at Southampton. During that year, she was the first ship to sail again from Bournemouth Pier. For the next thirteen years, she once again was used for holiday excursions in the Solent.

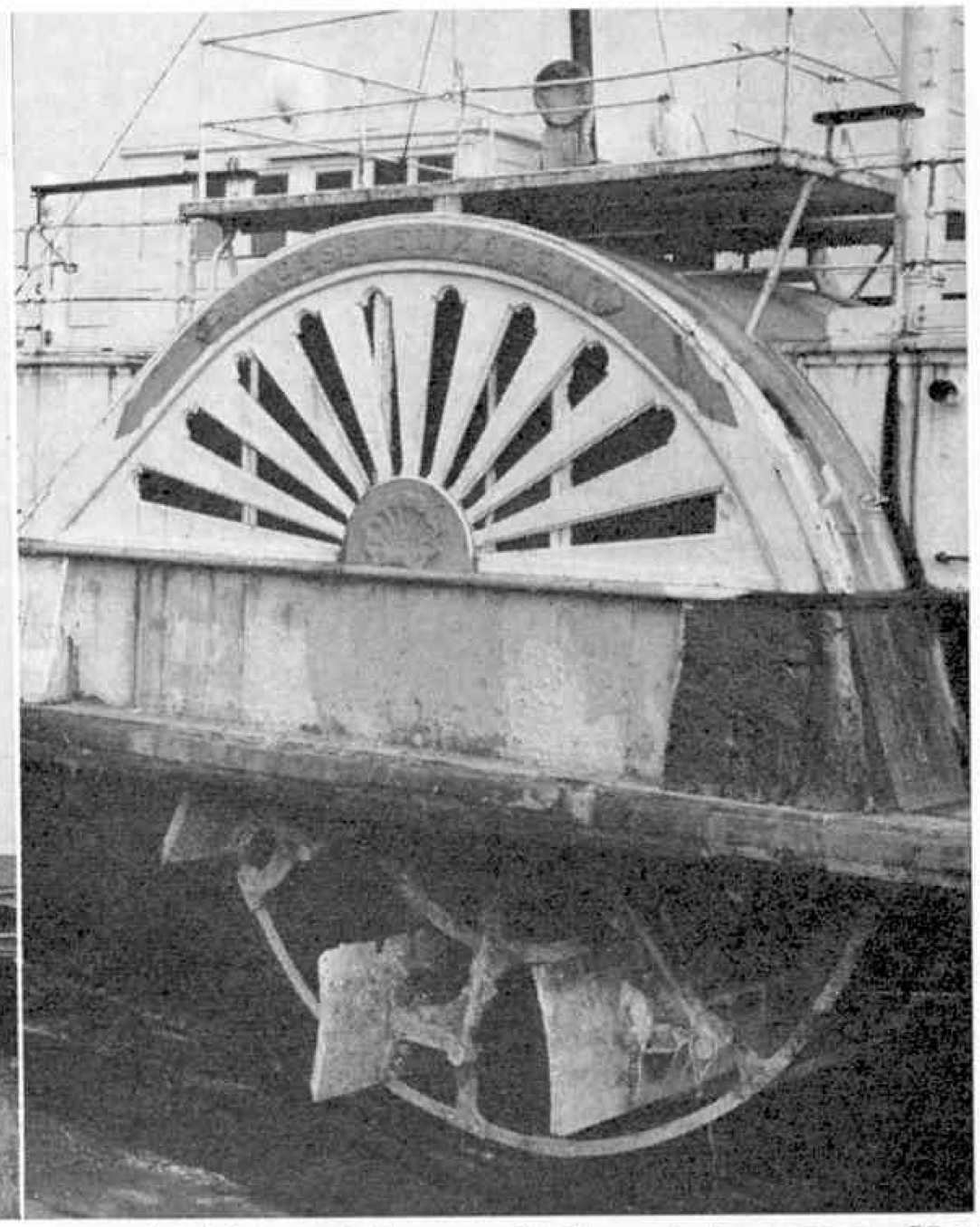
Redundant but by no means finished, the paddle-steamer made her way along the coast to Torquay in 1959. Under the ownership of Torbay Steamers Ltd. she still went a cruising but now along the South Devon coast and up the River Dart. '62-'65 saw her back at Bournemouth and Weymouth until retired in 1965.

There are not many of these old paddle-steamers left. Most have made their journey to the breakers yard but the 'Princess Elizabeth' has had a luckier fate. She is to be the centre of a brand new yacht marina costing £250,000 at Hayling Island, Hants. Her new owner, Mr. H. E. Butler, who bought her for £6,000, plans to use her as a restaurant, complete with dance hall and bars at a cost of around £15,000.

Already many of the Dunkirk survivors have visited her. To greet them she was dressed with flags and bunting. Her bright red and black funnel shows up well from the road bridge between the island and the mainland. The white paint on upper works and paddle boxes gleams above her black hull.

Like most of the later paddle-steamers, the 'Princess Elizabeth' was built with her funnel forward of the paddles. The bridge was immediately in front of the





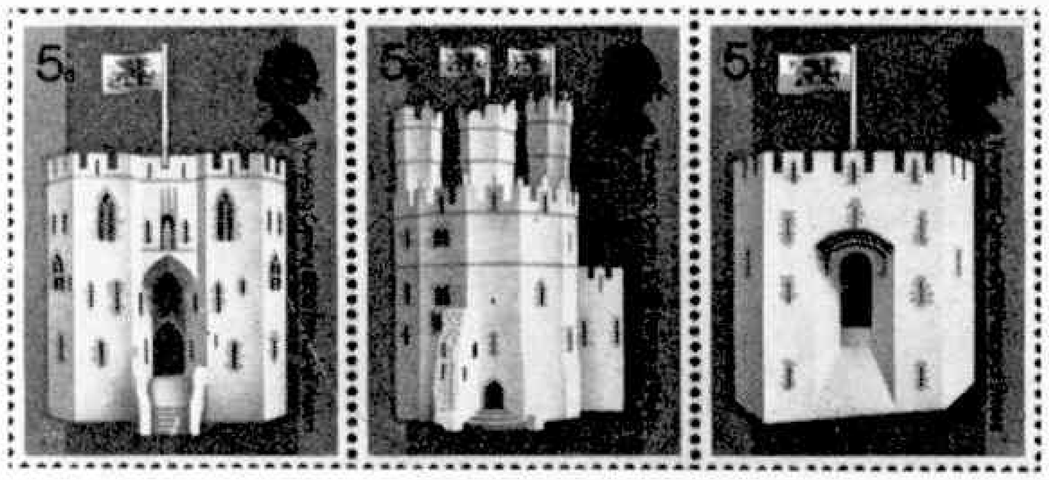
funnel. Her open foredeck and full width covered after-deck gave ample accommodation for passengers.

195 feet in length, the 'Princess Elizabeth' is 24 feet 2 inches in breadth with a depth of 8 feet. Naturally her engines were as important as her looks for it was essential that they should be as reliable as possible. Her compound expansion diagonal two cylinder engines of 23 inch diameter by 51 inch stroke proved highly satisfactory all through her career. Her nominal horse power was 94.

It is fitting that a vessel that has served the public for most of her sea-life, should continue to do so, though now ashore, for the 'Princess Elizabeth' will not go to sea again. She is however saved from the scrap-breaker's yard and will bring pleasure to many generations of sailors for many years.

GOD BLESS THE PRINCE OF WALES

by James A. Mackay



FIVE STAMPS were released last month in honour of the Investiture of the Prince of Wales at Caernarvon Castle. The stamps, designed by David Gentleman, comprised a strip of three 5d. stamps, a 9d. and a 1s., together with a 9d. air letter sheet. The strip of three shows parts of Caernarvon Castle associated with the Investiture ceremony—the King's Gate, the Eagle Tower and Queen Eleanor's Gate. The Prince entered the Castle through the gateway at the Eagle Tower and was subsequently presented to his people at the King's Gate and Queen Eleanor's Gate. The 9d. stamp illustrated a fine example of Welsh art —a Celtic cross from Margan Abbey, Glamorgan, while the 1s. stamp bore a portrait of the Prince based on a photograph taken at the time of his 20th birthday. All the stamps are inscribed in Welsh and English—Prince of Wales (Tywysog Cymru). This is only the second occasion on which stamps of this country have been inscribed bilingually; the Menai Bridge stamp released in April 1968 was inscribed " Pont Menai." The special air letter sheet has a decorative vignette on the address side, showing a view of the castle seen from one of its own windows. On the back flap of the sheet is a pen and wash drawing of the castle, with the sea and small ships in the foreground.

This is not the first time that Caernarvon Castle has appeared on stamps. Between 1955 and 1968 the castle was featured on the 5s. definitive stamp of Great Britain. Nor is this the first time that the Prince of Wales has been shown on stamps either. In 1950 New Zealand issued two Health (children's charity) stamps bearing a portrait of the then Princess Elizabeth with the baby Prince Charles. Two years later he was portrayed on the 2d. and 1d. stamp in the Health series of 1952, Princess Anne being shown on the 1½d. and ½d. value. Both portraits were based on photographs by Marcus Adams. Apart from these stamps no other postal issues have portrayed the Prince, although he and his sister were depicted on British National Savings stamps for several years, the designs being changed periodically as they grew up.

Prince Charles is the fourth Prince of Wales to appear on stamps. Three of his predecessors, of course, subsequently became kings of Britain and appeared on many stamps after they ascended the throne, but it is interesting to note that they also appeared on stamps before they became king.

King Edward VII had reached the ripe old age of sixty before he was crowned and so it is hardly surprising that several stamps should portray him as Prince of Wales. The first of these was issued as long ago as 1860 when the Prince was nineteen years old. In that year the Canadian province of New Brunswick released an attractive pictorial series, the highest value of which, 17c, portrayed Prince Edward in Highland dress. The same portrait was utilised by Newfoundland for a 1c stamp in 1868; a slightly amended version of this design, with the frame redrawn, was issued three years later. Originally this stamp was perforated but in 1877 it was released with a roulette separation. This design was also used for the 1c stamped postcards of the same period.

Another portrait of the prince in Highland dress was used for Newfoundland's 1c stamps of 1880. The earliest printings of this stamp were in shades of brown, but in 1887 the colour was changed to green. This youthful portrait remained in use till 1897, by which time Prince Edward was middle-aged. A more up-to-date likeness of the prince, in Guards uniform, was used for Newfoundland's 2c stamp of 1897. The stamp was first released in orange but the following year the colour was deepened to scarlet.

This series is particularly interesting in that three Princes of Wales were featured in it. The 5c stamp showed Edward's eldest son, then Duke of York and later to become King George V. *His* son, the infant Prince Edward, appeared on the ½c stamp, in the frills and flounces in which small boys were dressed at that time. When King Edward VIII ascended the throne in 1901, the Duke of York became Prince of Wales. In this role he and the Princess of Wales (later Queen Mary) were portrayed on a ½c stamp of Canada, released in 1908 to mark the tercentenary of Quebec. Those were the only stamps to portray Prince George during his lifetime before he became king but it is interesting to note that Australia issued a stamp in 1951 marking the golden jubilee of the Commonwealth, portraying the Duke of York opening the first Commonwealth Parliament in Melbourne in 1901.

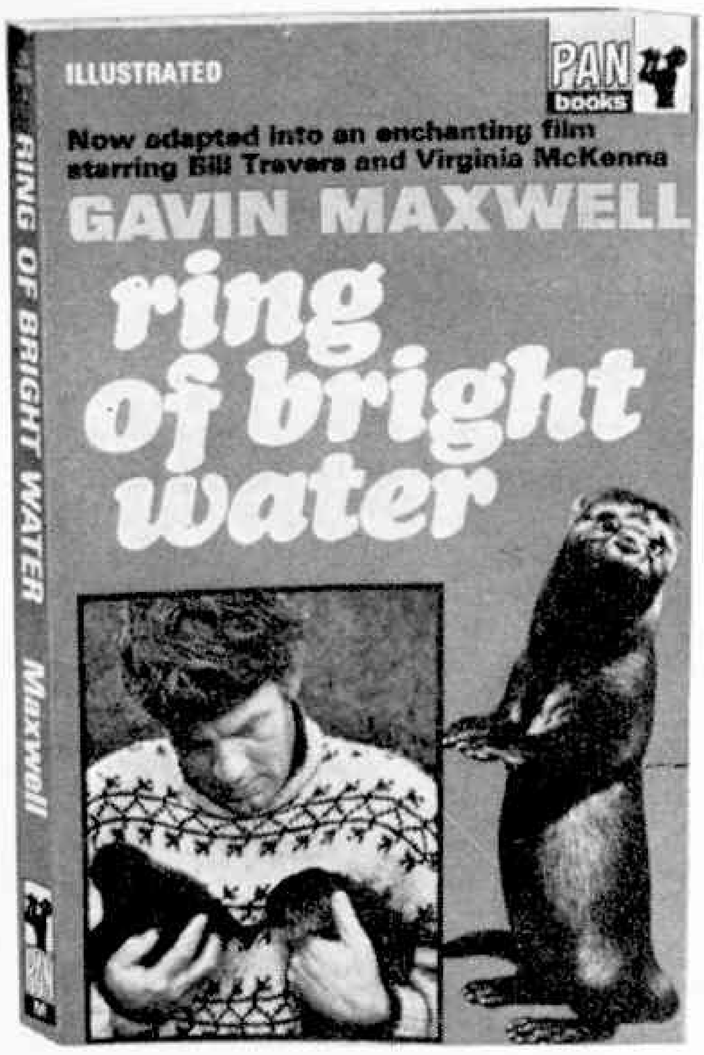
Prince Edward, later to become King Edward VII and now the Duke of Windsor, appeared on several stamps as Prince of Wales. The first of these was the 3c stamp in Newfoundland's lengthy Coronation series of 1911, when he was portrayed in the uniform of a naval cadet. Seventeen years later Newfoundland's Publicity series portrayed the Prince on the 4c stamp in the ceremonial uniform of Colonel-in-Chief of the Welsh Guards. His three feathers emblem and motto " Ich Dien " (I serve) were also incorporated in the design. In 1932 Newfoundland's definitive series also showed the Prince on the 4c value, this time in the undress uniform of the Welsh Guards while later in the same year Canada portrayed the Prince in Army service dress. The last stamp to feature Prince Edward as Prince of Wales was released by Canada in 1935, as part of the series celebrating the Silver Jubilee of King George V. The 5c stamp showed him in the uniform of Colonel-in-Chief of the Queen's Own Cameron Highlanders. The 2c stamp of the same series portrayed the Duke of York, later King George VI, but he was never Prince of Wales before becoming king, the reign of his brother being cut short by his abdication in December 1936.

RECOMMENDED READING

RING OF BRIGHT WATER

In last month's "Workbench", readers may remember that we issued part of an appeal issued by the magazine "Wildlife" on behalf of Otters. Our first review this month, appropriately enough deals with a book largely devoted to these delightful little animals.

It is available in two forms, the small paperback version, shown in the accompanying photograph, costing 5/- and the larger hard bound volume 30/-. Both books are almost identical in editorial content, but the large version has far more photographic illustrations. The Author GAVIN MAXWELL describes his life, largely spent in a remote area of Scotland 15 miles from the nearest town of any size. The emphasis throughout is on wildlife, in all its forms, from simple organic sea life to the two stars of the story, a couple of otters named 'Mijbil" and "Edal", and approximately two-thirds of the story is devoted to them. It is rather difficult to decide what appeals most in the contents, certainly the almost human antics of the otters make excellent reading, but


ILLUSTRATED
PAN books
Now adapted into an enchanting film starring Bill Travers and Virginia McKenna
GAVIN MAXWELL
ring of bright water
RING OF BRIGHT WATER Maxwell

perhaps the greatest impression is gained from the Author's style of writing. We tend to judge a book rather more by the mental pictures obtained, and from this point of view it is superb. Descriptions of the surrounding countryside and the natural harbour close by are marvellously put across in a manner seldom seen in many of today's novels.

This is a book that can be read by anyone between the age of 9 to 90 and is certainly not one to be thrown away when read. We consider it more than likely that many readers will upon reading the cheaper version, buy the larger one to keep on their bookshelves for the future.

Publishers: Longmans, Green & Co. Ltd. (30/- version). Pan Books Ltd. (5/- version).

COMBAT AIRCRAFT OF THE WORLD

This must surely be, at 6 gns, the most expensive book reviewed for a very long time in MECCANO MAGAZINE, but for anyone with a serious interest in Fighting Aircraft, it is a must. The author, John W. R. Taylor, is well known to magazine readers, for his series "Air News", and this book is compiled in his own expert way. John, incidentally has written no less than 135 books! This certainly is a tremendous feat in itself and one which cannot be equalled by many.

To return to the book under review, for the first time in aviation publishing, all the military aircraft that have ever entered squadron service with any country in the world are brought together in one volume. Arranged under twenty-six countries of manufacture, some 800 types of combat aircraft are described and illustrated. Approximately 2,000 photographs and three-view line drawings illustrate the main types and important variants. Statistics and performance data for each type are presented in tabular form, and the book is arranged so that text, tables and illustrations for each aircraft all appear on the same double-page spread. For completeness and ease of reference Combat Aircraft of the World is unrivalled.

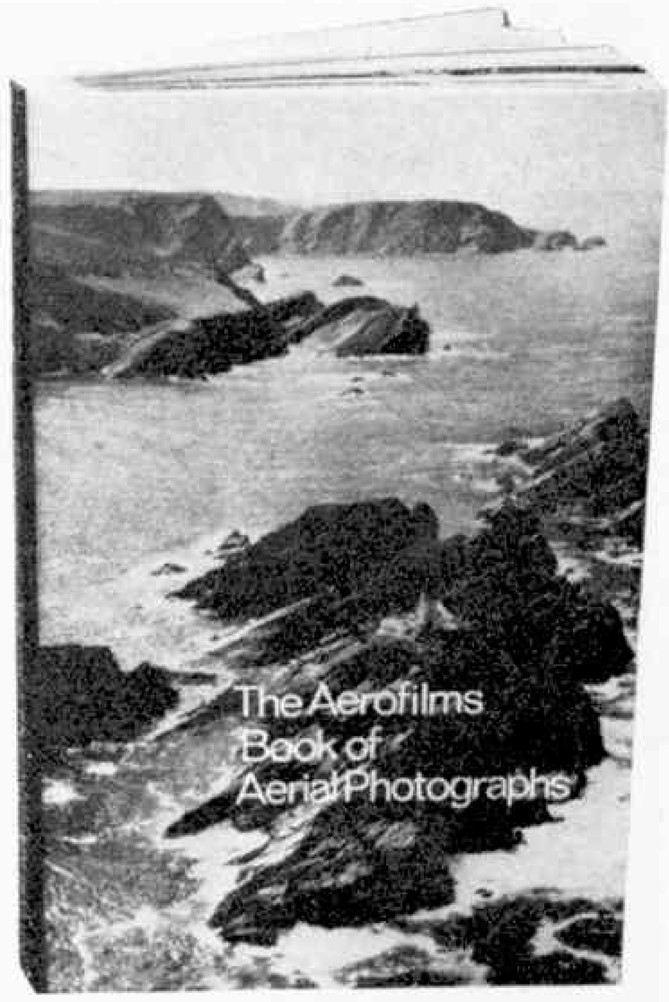
The introduction summarizes the history of military aircraft design, beginning with the earliest pioneers and concluding with the TSR2. Many of the illustrations in this section are of important prototypes and research aircraft that exerted a major influence on design but did not themselves enter first-line service.

A comprehensive index of aircraft types, fully cross-referenced, completes the book.

Combat Aircraft of the World is a definitive work of reference, giving the basic history and technical details of what are perhaps the most interesting and important classes of aircraft produced by the aviation industries of the world. It is a book for which there has long been a need, and it will prove indispensable to historians, students, model makers, technicians, libraries and all aircraft enthusiasts. Publishers: George Rainbird Ltd.

THE AEROFILMS BOOK OF PHOTOGRAPHS

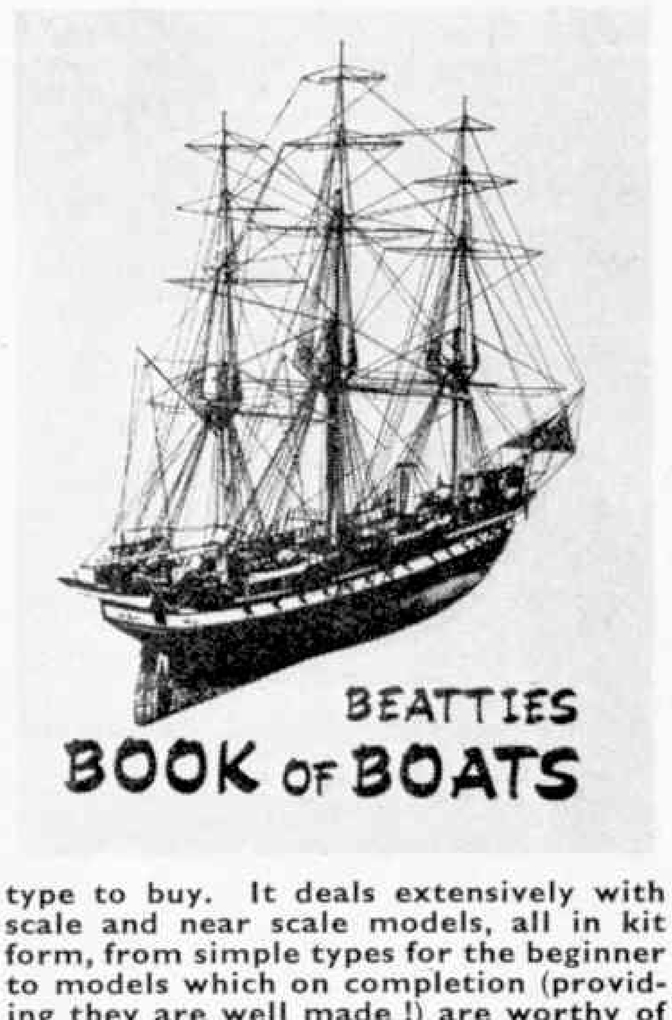
Following on from the Editor's mention of the Ariel Photography Co. in this month's Workbench, we thought readers may be interested in The Aerofilms Book of Photographs. It is primarily a catalogue of 500 selected photographs



taken from this company's range of over 300,000, although for anyone who appreciates photographs with a geographical bias, it makes very interesting "looking". Available from Aerofilms Ltd., 4 Albemarle Street, London W.1. 12/6 plus 1/6d. postage and packaging.

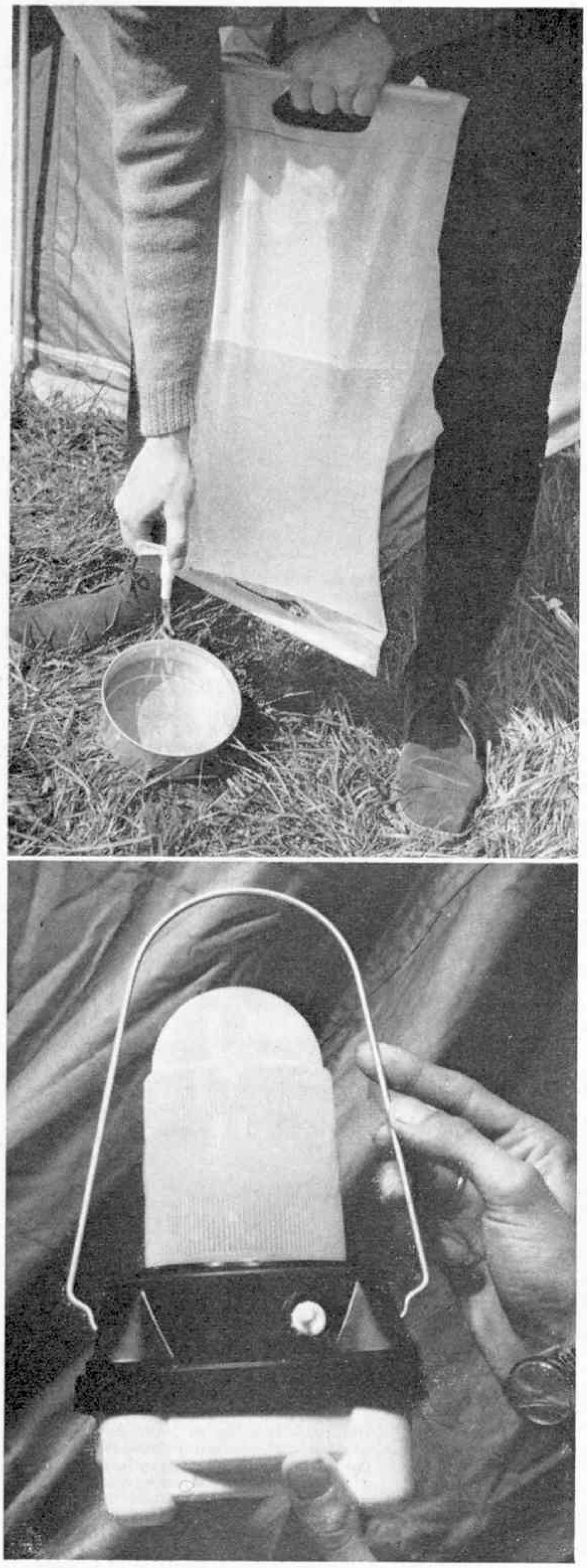
BEATTIES BOOK OF BOATS

If you are one of the many modellers who enjoy building working models of boats in wood "Beatties Book of Boats" will prove to be of valuable use in helping you to make up your mind as to which



type to buy. It deals extensively with scale and near scale models, all in kit form, from simple types for the beginner to models which on completion (providing they are well made!) are worthy of a place in a Museum. At the front of the book is a list of tools and materials needed to construct models, a useful guide, especially for beginners. An introduction is given to each manufacturers kits which briefly outlines their advantages and methods of construction, all helping towards making the choice easier.

Available from Beatties of London, 15 Broadway, Southgate, London N.14. Price 5/-.



LIGHTWEIGH

by the

I WAS 11 years old when I became the proud owner of my first tent. It wasn't new or (as I found out later to my discomfort) even waterproof. I exchanged an old air pistol and a much used chemistry set for it, and since that day I've never been without a tent of one sort or another.

Camping is one of those rare experiences that is very difficult to describe, it has to be done to be appreciated. To get away from houses and traffic, sleeping with only a thin piece of canvas between you and the stars is an experience not to be missed, and, believe it or not food *does* taste much better out in the open air!

My early days as a camper were tremendous fun, and once I had a tent, all the other necessary items that went with it were swiftly acquired from money earned by odd jobs, a paper round, birthday presents, and further swops. Weight was the prime consideration, as I had only my own two feet, and at best a bike to carry myself and my gear around.

Lightweight camping is the title given to this particular branch, and this article is intended to serve as a guide for those who are interested, however remotely, in "getting away from it all".

The Tent

Far and away the most popular type is the RIDGE TENT, and most lightweight types are based on this. In its simplest form it consists of a steeply sloping roof with small side walls and is shaped rather like a house. A useful modification to this design was the introduction of a bell end at the rear. This simply means that instead of a flat end wall, the tent is rounded outwards at this point, giving useful additional space for stowing gear inside.

From the water proofing angle today's tents are superb when compared with early types! However a severe storm can sometimes penetrate the canvas, and so to prevent this the fly sheet was introduced. This simply is an extra roof over the tent, an

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T CAMPING

Editor

inch or so above it, and reaching right to the ground. Not a must for general use but for the serious, all-weather camper a valuable extra. Last on the list of general extras are " A " poles. Most ridge tents have a central inside pole at each end, fine, but they do get in the way, especially when two people are inside. The " A " pole overcomes this problem quite simply. It is shaped like the letter " A " only without the cross piece, and stands *outside* the tent, the canvas being hung from it. This prevents the rather disturbing situation of a canvas collapsing in the middle of the night, due to a careless movement by anyone inside!

Sewn-in ground sheets are fitted to 99 per cent of today's tents, and, next to the flysheet are a major step forward in weather protection. They prevent water from running down the tent walls and so into the interior, keep out draughts, and finally for people with a fear of insects, prevent them from getting at your food supplies.

Most tents today are very good, but to be absolutely safe, buy one of the more well known brands, such as Blacks Bukta or Maréchal. Expect to pay between £15 to £20 for a good quality tent. Generaliy the more you can pay the better you can expect.

Sleeping Bags

The range of sleeping bags available, like tents, is enormous, and the different types considerable. The most important point is to choose one long enough! If you are under 6 ft. tall no problems should arise. Don't be afraid to " try one out " in the shop. How would you feel if on your first night you couldn't sleep because you were exposed to the elements from the chest up! Weight is of course all important to the light weight camper. Down sleeping bags are probably the best in this respect. Most good types are shower-proof, a point worthy of consideration. A soggy sleeping bag takes days to dry out. The good bags are rolled up from the foot and fit into a pouch at the head. This pouch doubles as a pillow at night when

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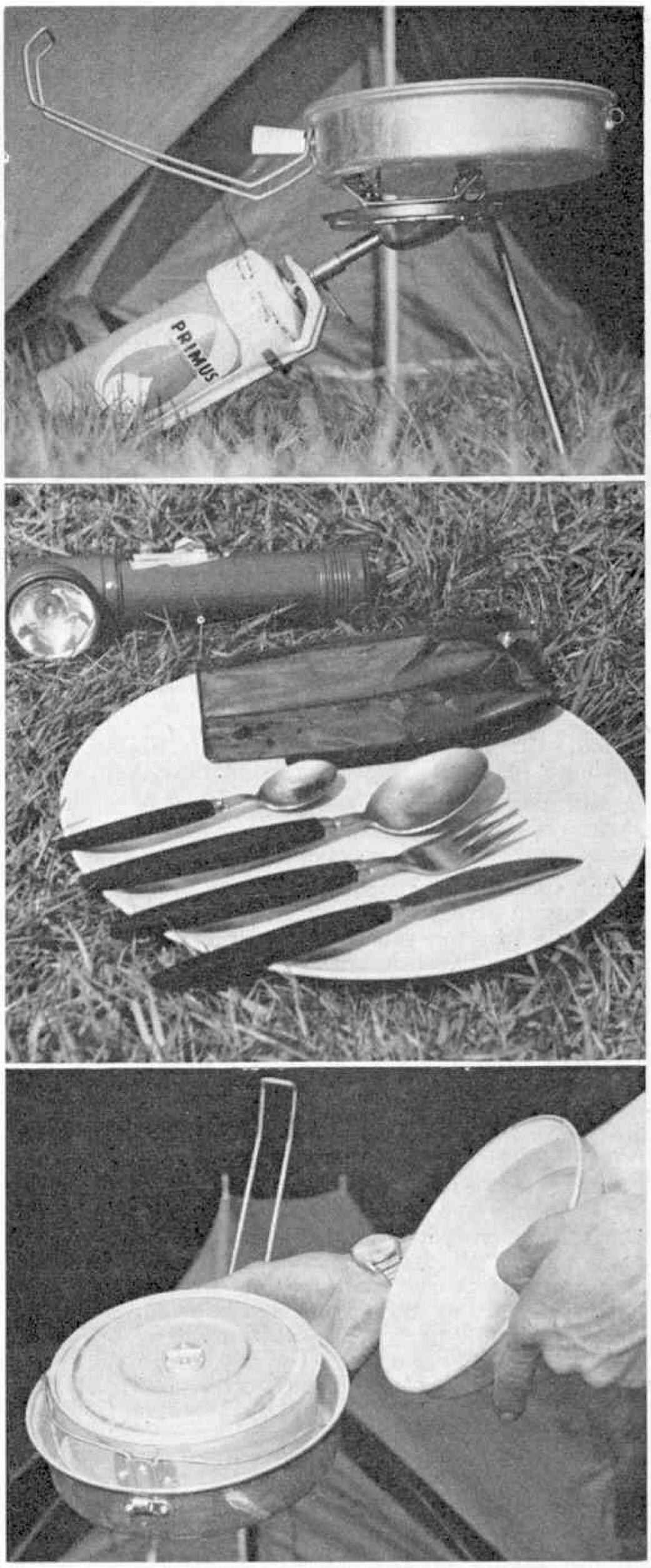
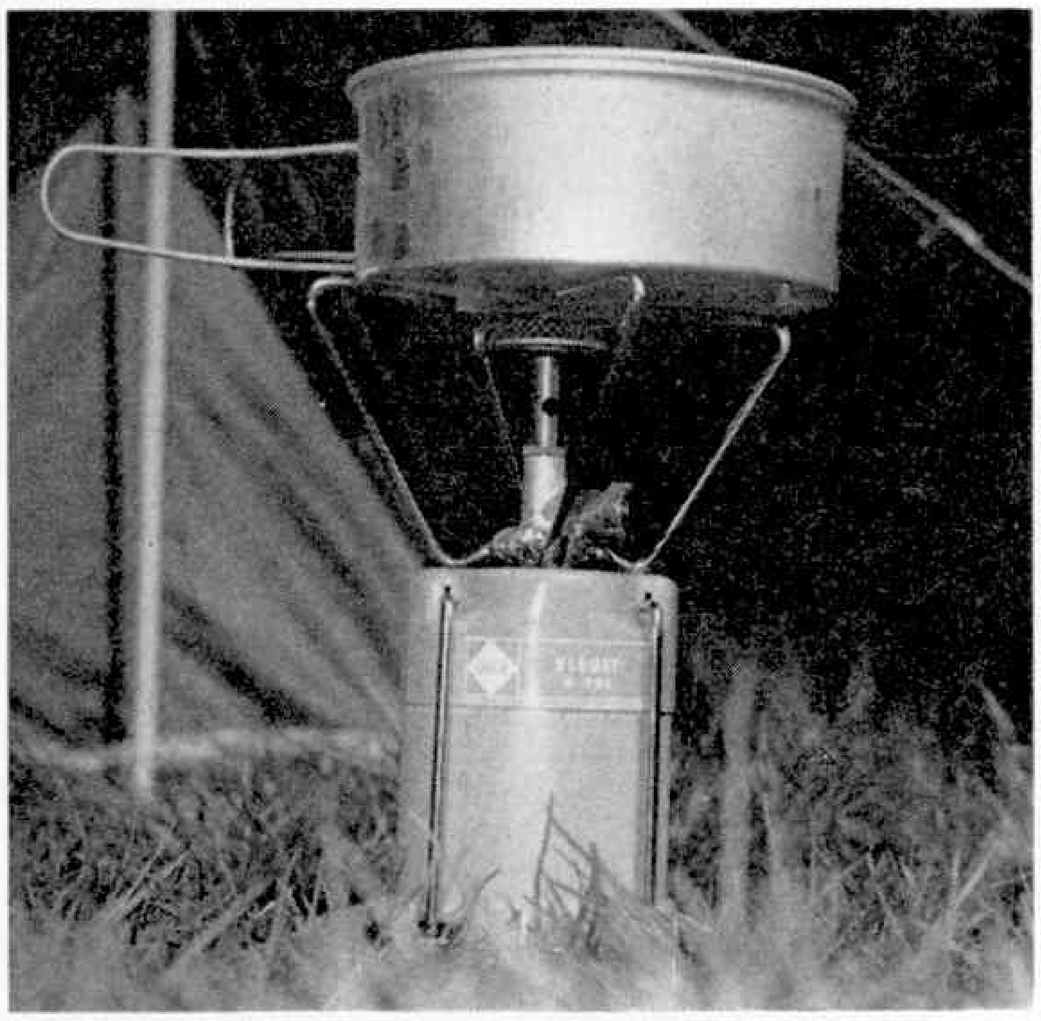


Centre right: The " Bell End " of the tent gives useful storage space for your Rucksack, etc.

Top: The powerful *Primus Grasshopper* in action.

Centre: Unbreakable plates, and strong cutlery are a must, as is the pocket torch.

Lower: This nesting canteen contains a frying pan and a saucepan. The lids of course double as small dishes.



The *Camping Gaz* stove, a compact unit with replacement cylinders available all over the world.

stuffed with the odd pullover, etc. The Blacks "Pal-O-Mine" fits the bill perfectly, combining light weight with warmth and comfort, and it costs £6 12s. 6d.

Rucksack

This piece of equipment needs very careful selection, and must fit across your back giving the feeling that it was made just for you. An ill fitting one can chafe your clothes and skin in a very short time and generally make life a misery. For fairly short "Hikes" a frameless type will be adequate, but make sure that the straps can be adjusted to suit your needs. Ensure that it is well padded across the areas that will come into contact with your back, and if need be load your prospective purchase in the shop with anything to ensure that it will be comfortable when loaded.

For those intending to walk long distances a "frame" type rucksack is the wisest choice. This type, as the name implies has a metal frame-work fitted which rests on your hips, this transfering a certain amount of weight from the shoulders. Do ensure that the framework doesn't "dig in" but fits snugly against you. An ill fitting frame rucksack is by far the worst source of trouble likely to be encountered by any hiker.

A final word of advice. Do make sure that your rucksack is waterproof. Your very comfort depends on it. Expect to pay £3 for a reasonable frameless type, and £5 for a frame rucksack.

Cooking Gear and Food

Main requirement for eating is of course food. So we will deal with this one first! We are fortunate today to live in a world of pre-cooked and dehydrated foodstuffs, all of which save the camper a great deal of inconvenience, and of course, our prime consideration, weight.

Surprise peas, meat (corned beef, minced beef, Vesta Curry, etc.), tinned puddings are real preparation savers. Take a tin of Marvel powdered milk. Never take glass bottles of anything unless absolutely unavoidable! Instant mashed potatoes are a boon—no heavy spuds to carry, and no peeling or long periods of cooking. Pre-packed bacon takes up very little space, and in normal conditions will keep for several days. Below is a list compiled by some campers we know giving a fairly comprehensive menu for two days in camp, which should put those in doubt on the right track.

Breakfast: Bacon and egg on fried bread, bread and marmalade, tea.
Lunch: Bread and cheese, apple, Coca cola.
Tea: Cup of tea, small packet biscuits.
Supper: Minced beef, peas, mashed potatoes. Tinned rice pudding, coffee.
Breakfast: Bacon and egg on fried bread, bread and marmalade, tea.
Lunch: Corned beef, pickle. Coca cola.
Tea: Cup of tea; cake or bun.
Supper: Vesta curry and rice, Surprise runner beans, individual fruit pie, coffee.

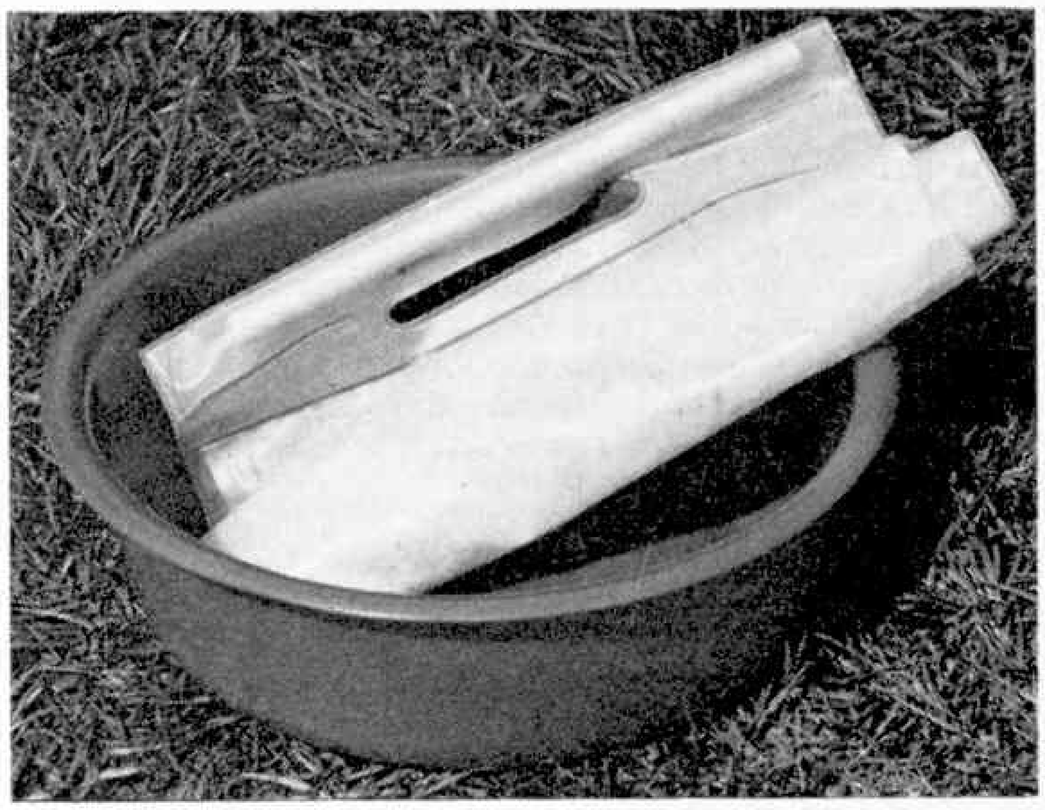
Use instant coffee and tea, of course (taken out of their glass jars and put into small plastic containers—this also applies to marmalade and pickle).

You will of course need to heat up water and cook meals, which brings us to our next subject.

Stoves

The gas types are best for anyone these days. Clean, quick, ridiculously simple in operation, they are rapidly replacing the earlier petrol and paraffin types. We show two types in our photographs, both of which are excellent value for money, and are the most popular. The Butane Gas cartridges are simply fitted to the stoves, and are thrown away when empty. A word of warning, *never be tempted to use your stove inside the tent* and always carry a spare cylinder.

The cost of a small gas stove is 30s. and a replacement cylinder approximately 4s.

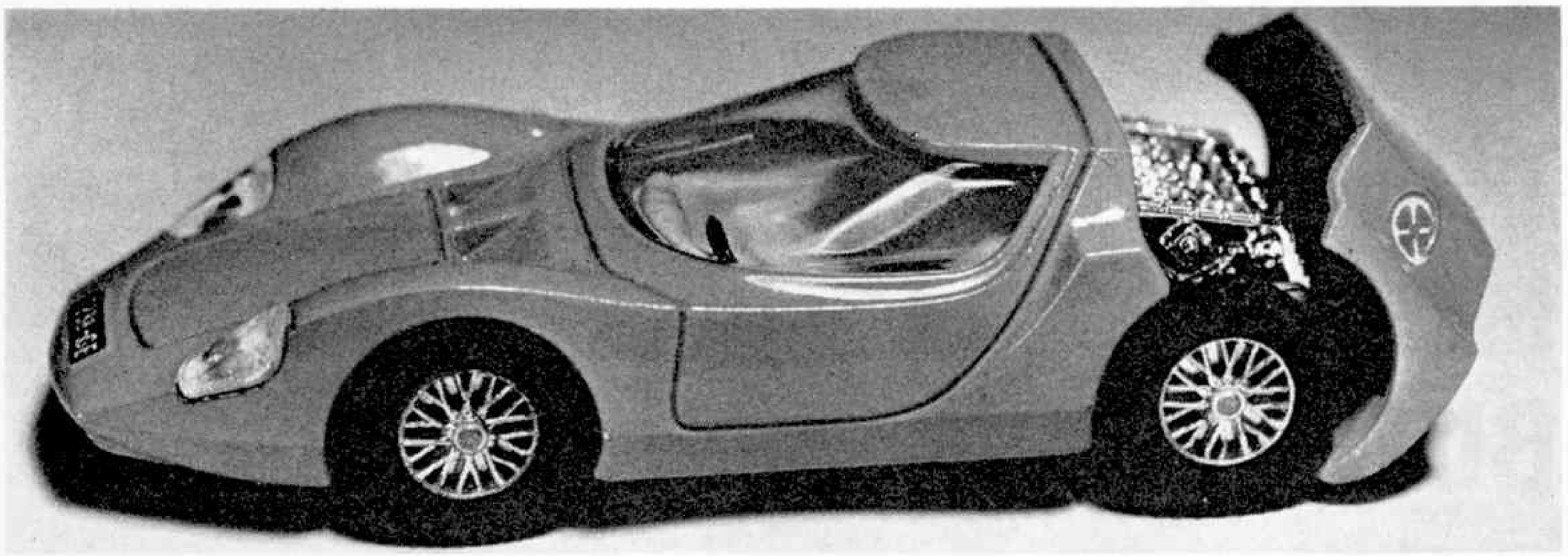


This polythene bowl was given away with a popular brand of soap powder, and was flexible enough to be packed into a small space. Inside it is shown the collapsible water carrier.

Utensils

Cutlery from home will do here, take an extra knife and spoon for cooking. Saucepans, etc., are available for campers; made from aluminium, they are light in weight and fit one into the other for space saving. These cost approximately 30s. A water carrier is a very necessary item. Our carrier is made from polythene and holds 4 gallons, more than enough for most

Continued on page 411



A close-up view of the Dinky Scarabeo with its engine cover open to reveal the highly detailed engine moulding. Note the realistic " wire " weeds fitted to the model.

SPEEDWHEELS GO SPORTING

by Chris Jelley

LAST MONTH saw the Meccano Magazine debut of that fabulous Dinky feature, Speedwheels, as fitted to the new Pontiac Parisienne. This month, however, Speedwheels really get into the fast-moving swing of things with a model of a car designed purely for speed and high performance—the Alfa Romeo O.S.I. Scarabeo.

A product of the world-famous Alfa Romeo company of Milan, Italy, the Scarabeo is beautifully distinctive with its low, sleek shape and " chopped off " back, yet it is a car which you are not likely to see on the roads of Britain—or even of Italy, if it comes to that—as this particular example was produced as a " one-off " special. In a sense, this is a pity because it is a car that would hardly fail to appeal to sports enthusiasts, not only because of its bodywork design, but also because it has a top speed in excess of 140 m.p.h. Even this maximum speed, though, is not particularly unusual in a high performance sports job, but what really does come as a surprise, at least to my mind, is the fact that this speed comes from an engine with the comparatively low capacity of 1600 c.c. Mind you, even with this capacity, the engine develops a power output of no less than 160 B.H.P. so you can imagine how much of a precise piece of craftsmanship it is !

All in all, the Scarabeo is an ideal vehicle to serve as a pattern for a Speedwheels-sporting Dinky Toy. Fast car, fast model, you might say, and the Dinky Scarabeo, Sales No. 217, *is* fast. Give it a good push on flat, smooth ground and it will streak away from you at great speed ! What's more, it will carry on running and running until long past the point where any " ordinary " model would have stopped.

Such performance is, of course, due to Speedwheels, so, for the benefit of readers who might have missed last month's article, I should explain that Speedwheels are free-rolling wheels, with built-in low-friction bearings, which are mounted on new-style axles made from thin but very strong steel wire. The combination of the special bearings and thin axles results in a model fitted with them running a lot faster and very much further than a model fitted with normal wheels and axles, and it will run extremely smoothly and quietly as well. In addition, the " spring " in the axles will, in most cases, serve the same purpose as all-round independent suspension, so you can see that Speedwheels are a vast improvement on their earlier counterparts.

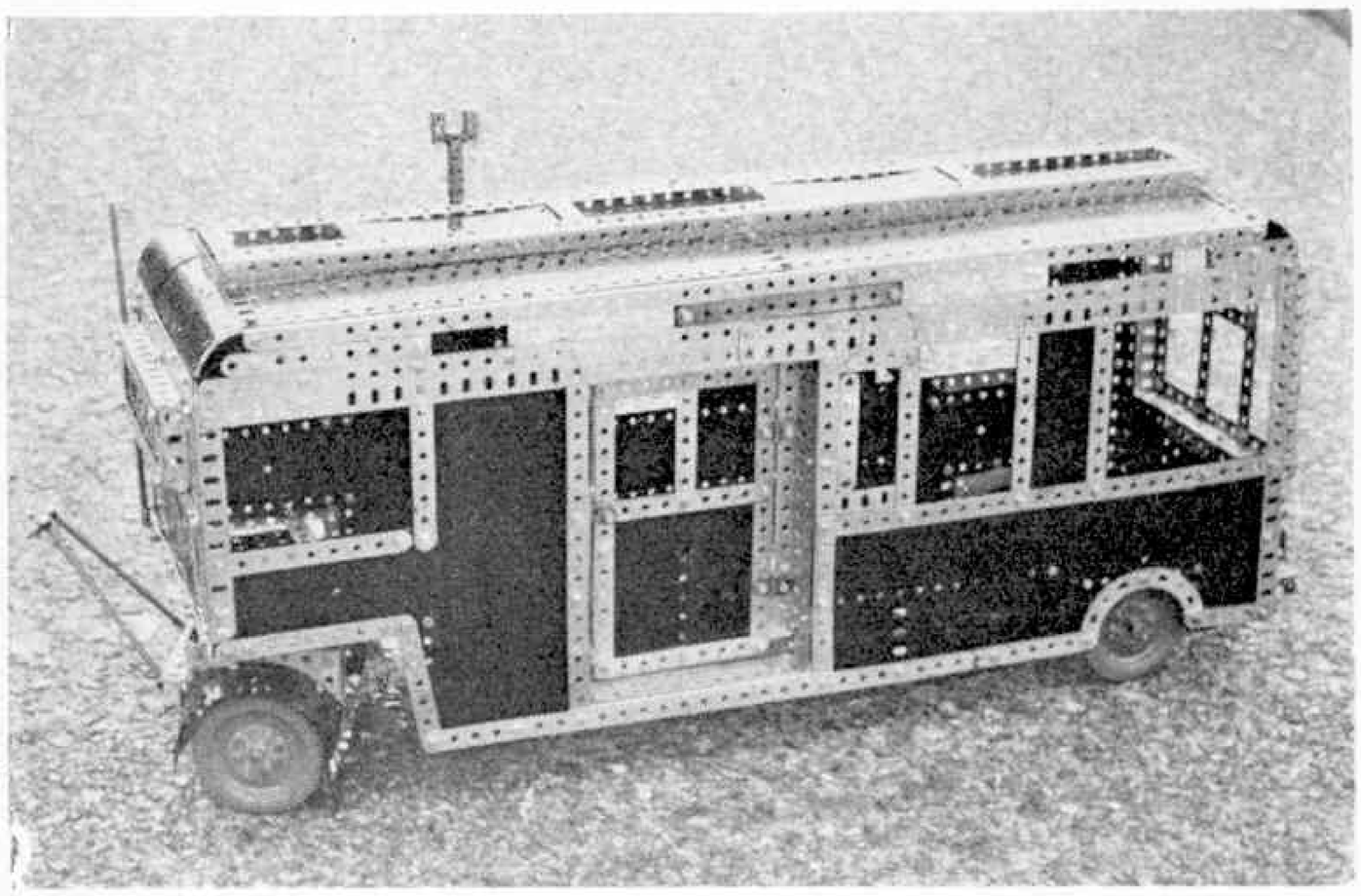
In the case of the new Scarabeo, the suspension effect is very much in evidence, but it is by no means the only appealing feature. Also included are windscreen, seats, steering wheel, moulded " glass " headlamps, number plates and—more impressive still—an opening engine cover at the rear which hinges back to reveal a miniature " engine " in a shiny plated finish. The detail on this engine is minute, even down to incorporating what looks like boltheads, and it is undoubtedly based on an Alfa Romeo original. How do I know ? Because the words " Alfa Romeo " actually appear on the top of the engine moulding !

Overall finish of the model before me is in a flamboyant—almost fluorescent—light red, set off beautifully by a pale yellow seat moulding which is, itself, set off by a black steering wheel. The effect is striking and gives the finishing touch to a Dinky Toy which is bound to become a great success.

New Dinky Catalogue

By the time this magazine goes to press, issue No. 5 of the Dinky Toys catalogue will be available from your local dealer. If you want to know what models are included in the Dinky range and what they look like, as well as their recommended retail price, then this catalogue is a " must." It contains 22 pages of illustrations in full colour showing more than 100 models and lists many more which lack of space prevented being shown. It's also good for a preview of some of the great new Dinkys yet to come, so why not call on your dealer and invest in a copy ?

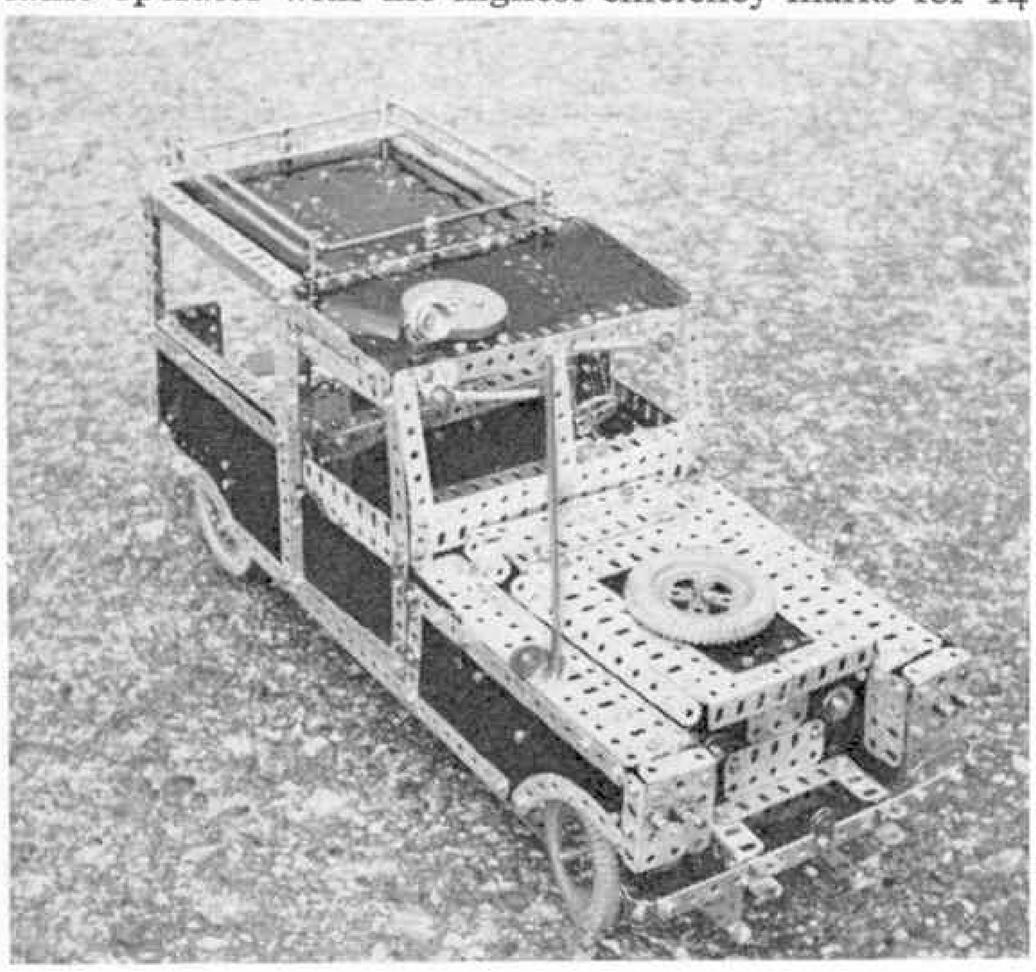
AMONG THE MODEL BUILDERS with Spanner



IN MY years with Meccano Magazine I have seen many things to surprise and impress me but never —and I mean NEVER—have I seen anything so impressive as the work of Gerald Hutton of Bexhill-on-Sea, Sussex. Gerald, as I have mentioned in these pages once before, is totally blind yet this does not prevent him from taking a true enthusiast's interest in Meccano. Nor is this interest purely passive. In fact, it is quite the opposite, as Gerald actually *builds* complete Meccano models—and good ones, at that—entirely unaided !

The results he obtains are fantastic when you consider that he is blind. Illustrated in two of the accompanying photographs, for example, are a Landrover and Caravan he recently completed while in hospital recovering from an accident. Both models are easily identifiable and, quite truthfully, are considerably better built than many I have seen from adults with perfect vision.

Gerald's accident took the form of a broken leg, sustained in a fall, and it was doubly unfortunate because it happened on the eve of the start of his first permanent job, Gerald having passed out from Letchworth Training Centre a short time before as a capstan lathe operator with the highest efficiency marks for 14 years. News of the accident soon reached the Secretary of the Midlands Meccano Guild, of which Gerald is an honorary life member, and other Guild members were quickly informed of his whereabouts and difficulties. As soon as he was able to sit up, he sent home for his Meccano kit and got cracking again on his favourite hobby. During a visit, the Guild Secretary spotted the Landrover in the course of construction and members in the area subsequently kept in touch with its progress and that of the Caravan, assisting with parts and descriptions whenever necessary. Full credit goes to Gerald for his courage and cheerfulness in tackling these models and readers will agree that he has succeeded in producing excellent lines and details in both of them.



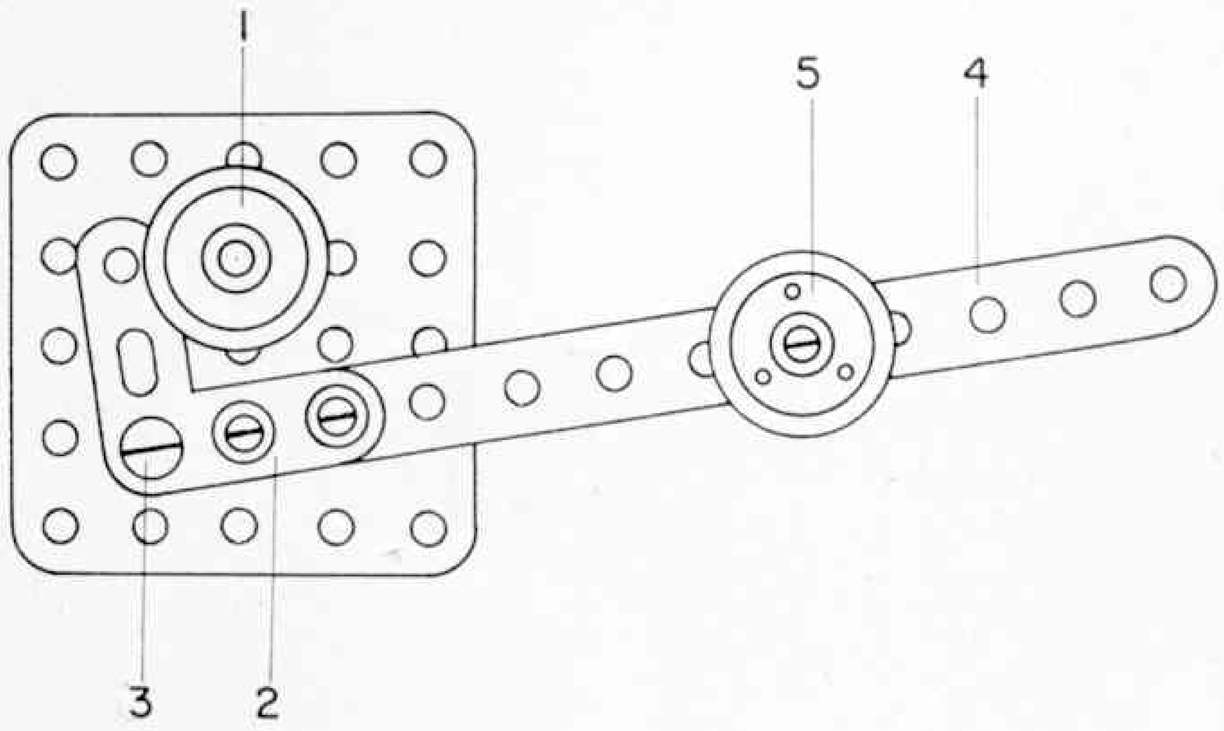
The Landrover is complete with gear-box and differential, and has a dummy steering column gear-change lever. A peculiarity of the model is in the left hand drive which Gerald admits is a quirk of his own, arising from the " upside down " position in which he holds the model for most of the time when fitting any steering gear. The engine is detailed with cylinder block, fan and fan belt, carburettor and air intake and the bonnet lid hinges as shown. Coachwork is in " safari " trim complete with mirrors, lamps, searchlight, spare wheel, roof rack, hinged tail-board and spare wheel. Passenger space is fitted with bench seats, while windscreen wipers and radio aerial are also fitted externally.

The caravan is of the " permanent home " type as used by the major travelling fairgrounds and Gerald has once again produced a most realistic model outline. The caravan has roof vents, " front door," windproof flue pipe, number plates, lights and correct swivelling tow gear. Gerald is to be congratulated on both models, which were featured at the hospital's garden fete and formed the centre of a competition for guessing the number of Nuts and Bolts, the result of which was that he raised £11 for the hospital funds. Well done Gerald ! I understand from the Secretary of the M.M.G., by the way, that Gerald's new job is being held open for him, so after a short convalescent period, he will once again be " back in production."

My thanks for being given the latest news of Gerald

Above: This home-type caravan illustrates the amazing ability of Gerald Hutton.

Left: A landrover to pull the caravan, also built by Gerald Hutton.



Left: A simple but effective dual-purpose Brake for use with cranes and similar model. Below: Pat Lewis thought up the Dog Clutch mechanism, outstanding for its easy engagement. Another view of this mechanism is shown on page 405.

Hutton go to Bert Love, Secretary of the Midlands Meccano Guild, and I must also thank Bert for the details of the Brake Mechanism, appearing in the accompanying sketch. This Brake, originally designed by David Goodman of Stratford-on-Avon, is ideal for use in a crane model and a quick glance will show that it is a very simple affair, requiring only a few readily available parts. It is remarkably effective and versatile, just the same, however. A 1 in. Pulley with boss 1 is fixed on the winding drum shaft or, indeed, on any running shaft in the crane hoisting mechanism, its groove making a positive location for the vertical arm of a Bell Crank 2, free to swivel on a Pivot Bolt 3. The horizontal arm of the Crank is extended by a $5\frac{1}{2}$ in. Strip 4 which acts as the brake lever. Secured to this is one or more 1 in. Pulleys without boss 5, the quantity and position of these Pulleys determining the brake tension to be applied.

Because of the design of the mechanism, it can be used either as a dead-stop brake or as a " slip " brake, allowing the fall of the load or the speed of a shaft to operate at a pre-determined rate by critical adjustment of the counterweights supplied by Pulley(s) 5. Its checking and holding power can be improved even further by slipping a short length of rubber sleeving, cut from the neck of a toy balloon, over the vertical arm of the Bell Crank. The following parts list, by the way, applies only to the component parts of the brake and not to any part of a model to which the brake might be fitted.

PARTS REQUIRED

1—2	1+—22a	2—37b	1—111c
1—22	3—37a	2—38	1—128
			1—147b

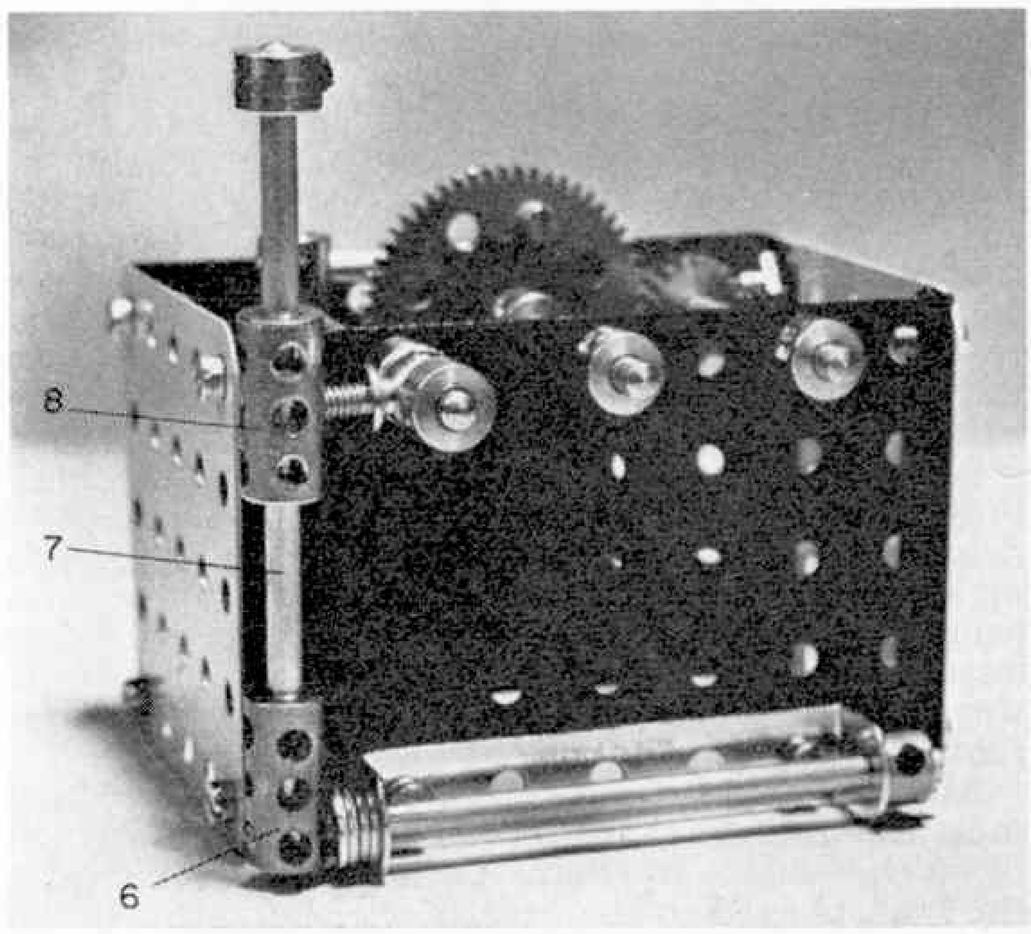
Dog Clutch

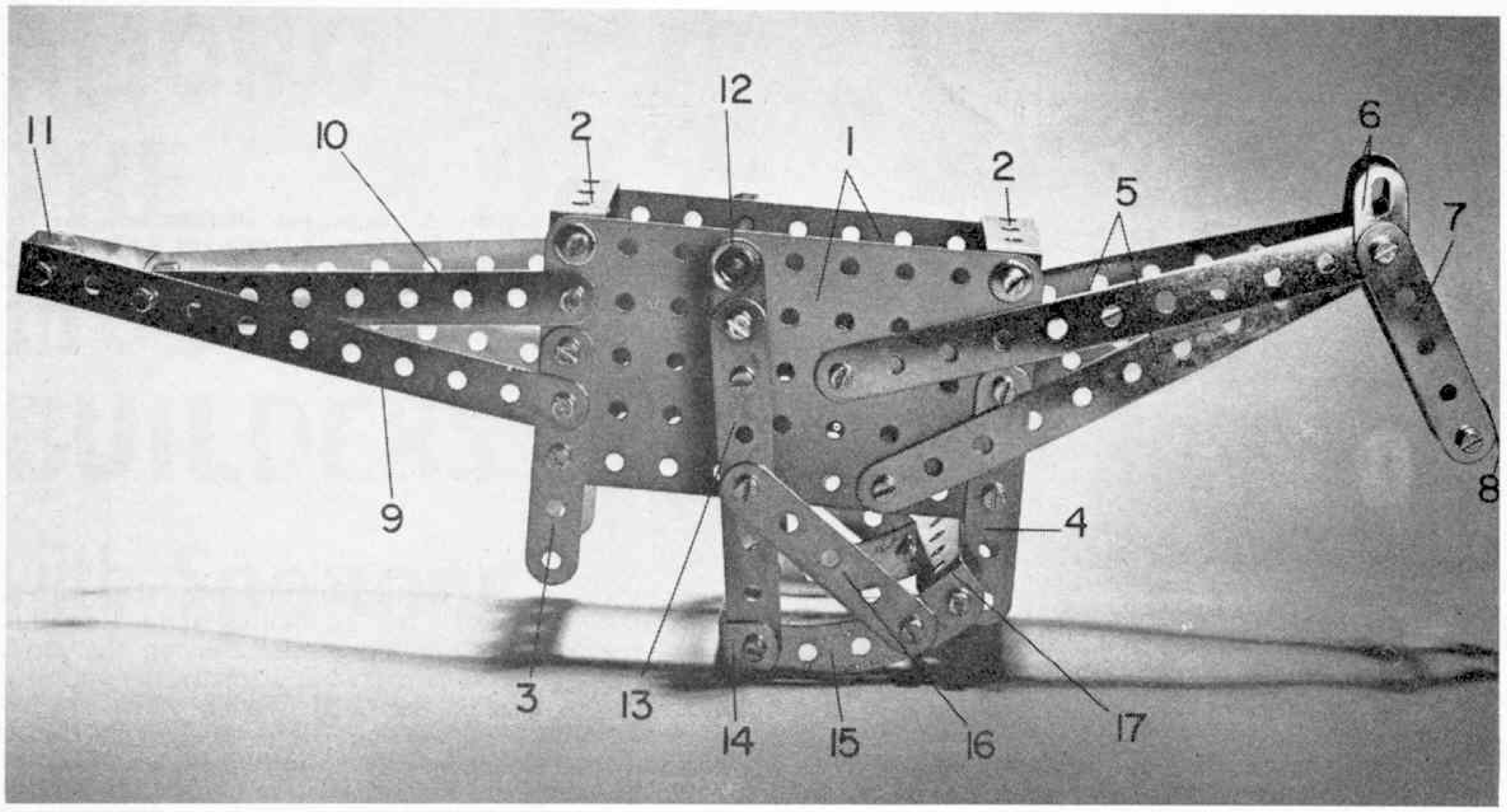
Our final offering this month comes in the form of an uncomplicated, but extremely positive Dog Clutch mechanism—another result of the inventive ability of Mr. Pat Lewis of Formby, Lancs. For the purposes of this article, the mechanism has been mounted in a framework supplied by two $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flanged Plates joined together by two $2\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plates, but, in practice, the mounting would depend entirely on the model in which the mechanism was fitted, as also would the lengths of the Rods used in the mechanism. The following description, however, applies to the unit as illustrated.

The input shaft consists of a $3\frac{1}{2}$ in. Rod 1, on which is fixed a $\frac{1}{2}$ in. Pinion 2. This Pinion meshes with a 57-teeth Gear Wheel 3 free on another $3\frac{1}{2}$ in. Rod, but held in a Socket Coupling 4, also free on the same Rod. Two *Set Screws* are fixed in diametrically opposite holes in the face of the Gear Wheel, while a $\frac{3}{4}$ in. Sprocket Wheel 5 is mounted tight on the Rod in the position shown. When Socket Coupling 4, with Gear 3, is moved along the Rod, the heads of the Set Screws engage neatly with the teeth of Sprocket Wheel 5 to complete the drive. It is important to remember that Set Screws must be used in Gear Wheel 3, as the heads of ordinary Bolts are too large to engage properly between the teeth of Sprocket Wheel 5.

Incorporated in the unit as a sort of bonus is a very effective control lever which is well worth bearing in mind for other mechanisms. It is built up from a Coupling 6 mounted on a $3\frac{1}{2}$ in. Rod journalled in the lugs of a $2\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip bolted to the unit's framework. Fixed in the longitudinal bore of the Coupling is a $3\frac{1}{2}$ in. Rod 7, on which another Coupling 8 is loosely mounted. A Handrail Support is screwed into one transverse tapped bore of this second Coupling, a 4 in. Rod 9 being held by Collars in the head of the Handrail Support. Secured on Rod 9 is a third Coupling 10, in the end transverse bores of which two $1\frac{1}{2}$ in. Rods are fixed. These Rods engage in the waist

Continued on page 405





This Kangaroo " toy " hops down a slope, " feeding " on the way—rebuilt from September 1927 M.M.

A LOOK AT NATURE

Spanner takes a look at some animal novelties in Meccano

IT HAS often been said that there is something of the child in all of us and, judging by the adult interest aroused at Meccano by the two models featured here, this is perfectly true. Despite being intended for children, both have been thoroughly " tested " at regular intervals by virtually everyone who has seen them, so much so, in fact, that it's a wonder they survived to be photographed !

Actually, the models hardly qualify as " models " in the true sense of the word, being more " novelties " designed purely to amuse. Both are based (roughly!) on animals, one on a woodpecker and the other on a kangaroo. When actuated, the woodpecker furiously attacks the trunk of a " tree " as it slowly works its way down it, while the kangaroo hops down a slope, feeding as it goes.

Melvyn Wright of Melton Mowbray, Leicestershire, must take full credit for the Woodpecker, construction of which is simplicity itself. A 1 in. Rod 1, representing the beak, is fixed in the head of a Handrail Support 2 which is, in turn, held in the boss of a Small Fork Piece 3. The arms of the Fork Piece are secured to the boss of a Pawl 4 by Nuts on the shanks of Bolts screwed into the tapped bores of the Pawl's boss, the Bolts themselves serving to fix the Pawl on a Flexible Coupling Unit 5. Also mounted on the Flexible Coupling Unit is an ordinary Coupling 6 and a Handrail Coupling 7 completing the actual bird and the " branch " on which it perches. The branch, however, must be mounted on its " tree " which consists of nothing more than an 11½ in. Axle Rod fixed in the boss of a 3 in. Pulley 8, fitted with a Motor Tyre, the Rod passing free through the head of Handrail Coupling 7. Stops for the woodpecker are provided by two Collars 9, one fixed at the top of the Rod and the other towards the lower end, as shown.

When in place, the distance between Pawl 4 and Handrail Coupling 7 is important and should be about 19 mm., while the bird should lean towards the tree with its beak not quite touching it. To operate, the woodpecker should be raised to the top of the tree and given a flick, to start the Flexible Coupling Unit vibrating, and released. The bird should then move slowly down the tree, pecking away rapidly as it does so. The speed of descent and rate of peck can be varied by altering the distance between Pawl 4 and Handrail Coupling 7.

The following parts list, incidentally, applied to the model as illustrated, but the model could be altered slightly to suit the parts available. Pulley 8 with its Motor Tyre, for example, could be replaced by a Flanged Plate, or the Rod could even be held by hand. It's really a question of trying things out.

PARTS REQUIRED

1—13	2—37b	1—116a	1—142b
1—18b	2—59	1—136	1—147a
1—19b	1—63	1—136a	1—175
2—37a			

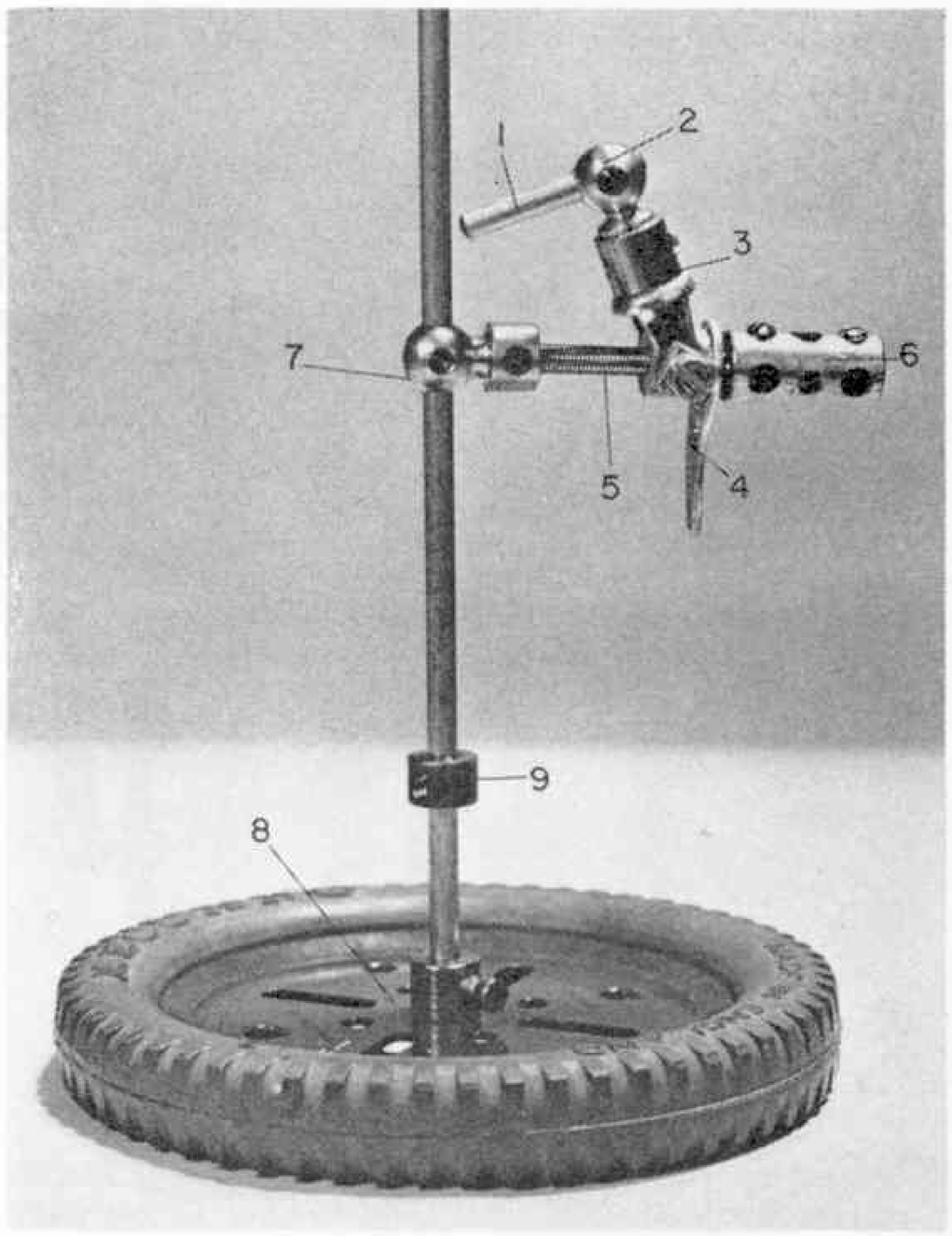
This woodpecker toy slowly works its way down the " tree ", " pecking " furiously at the trunk as it goes.

Kangaroo

Chosen as a partner for the Woodpecker, the Kangaroo is based on a model which first appeared in a 1927 issue of Meccano Magazine. To build it, two $4\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plates 1 are joined together at the corners by four $1\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strips 2, the securing Bolts in the case of the lower Angle Strips also helping to hold $2\frac{1}{2}$ in. Strips 3 and 4 in place at each side. Two $5\frac{1}{2}$ in. Strips 5 are then bolted to each Plate 1 to represent the neck, the two Strips in each pair being brought together at the end and fixed to the opposite pair by a Double Bracket, at the same time fixing in place two Fishplates 6 to act as ears and two $2\frac{1}{2}$ in. Strips 7 to serve as the head. The lower ends of Strips 7 are connected together by a second Double Bracket 8. In the case of the tail, a $5\frac{1}{2}$ in. Strip 9, braced by a $4\frac{1}{2}$ in. Strip 10 is bolted to each side of the model, the free ends of Strips 9 being joined by another Double Bracket 11.

A large moving rocker is next produced from two Cranks 12, each extended by a $3\frac{1}{2}$ in. Strip 13. Strips 13 are connected at their lower ends by a $2\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 14, the securing Bolts also fixing in position two $2\frac{1}{2}$ in. Curved Strips 15, one at each side. Each of these Curved Strips is braced by a $2\frac{1}{2}$ in. Strip 16, bolted to respective Strip 13, while both Curved Strips are joined together by another $2\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 17. The rocker is then mounted, by means of Cranks 12, on a $2\frac{1}{2}$ in. Rod, journalled as shown in Flat Plates 1, to finish the model.

When the Kangaroo is placed on a gently sloping surface, it should rock forward on the rocker until it tests for a moment on its front legs and nose, at which time the rocker should be clear of the ground. The rocker should then swing forward until it makes contact with the ground again, when the sequence is repeated. At the same time the model should move forward with the forward movement of the rocker. It's great fun !



PARTS REQUIRED

6—2	2—10	40—37b	2—53a
2—2a	3—11	4—38	2—62
2—3	1—16a	4—48	2—90
8—5	40—37a	2—48a	

AMONG THE MODEL BUILDERS

Continued from page 403

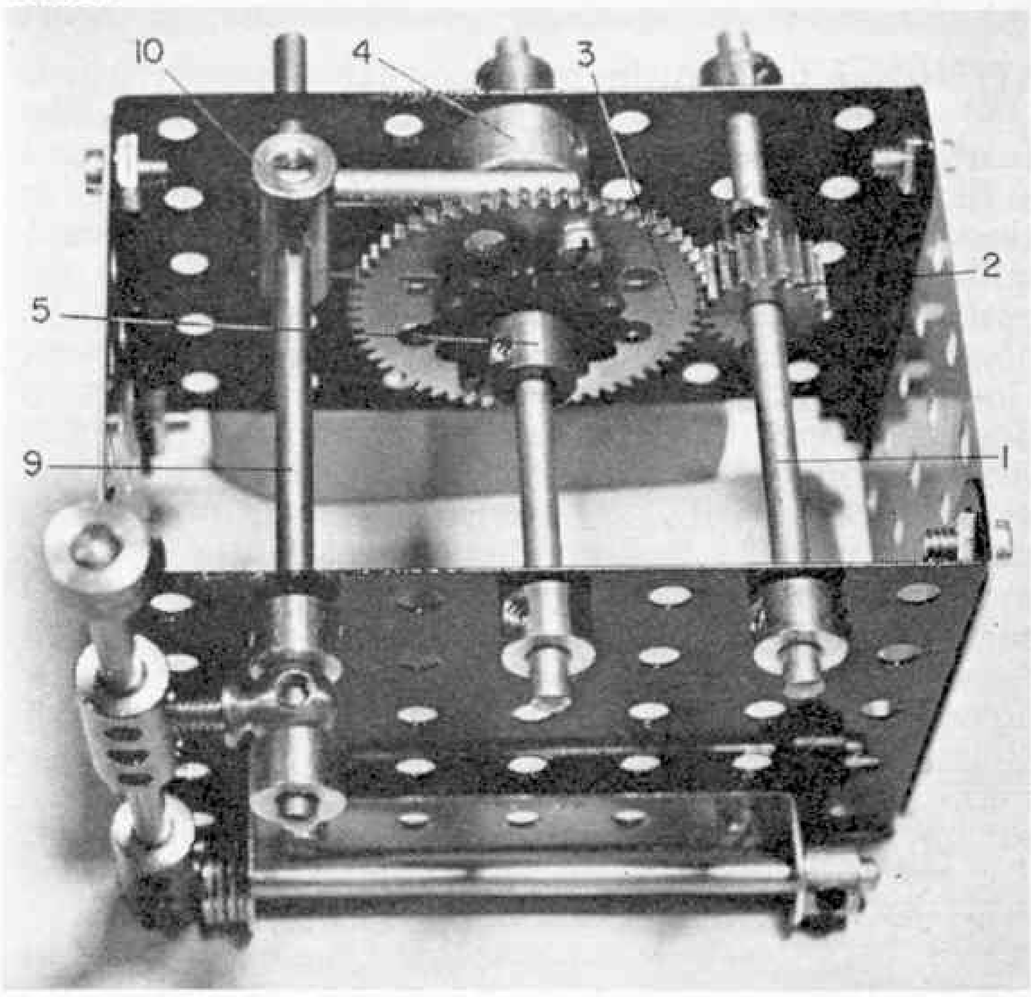
of Socket Coupling 4 so that movement of lever 7 actuates the clutch.

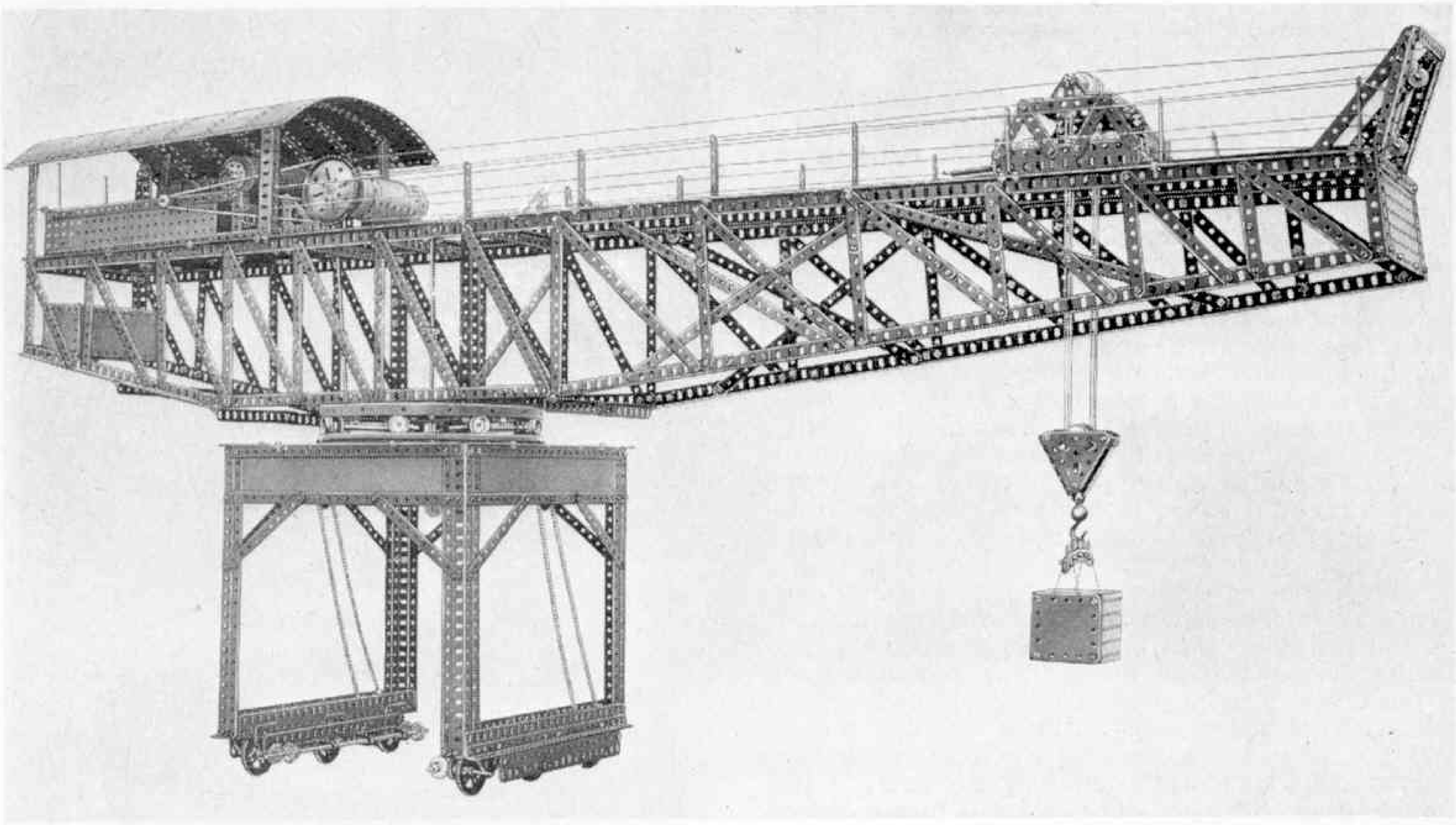
PARTS REQUIRED

1—15b	1—27a	4—38	3—63	1—96a
4—16	10—37a	2—53	2—69	1—136
2—18a	8—37b	8—59	2—72	1—171
1—26				

Interesting Activities

Before closing, I would like to mention something which came to my attention recently. As you may remember, we have remarked on a couple of occasions that the activities of Meccano Clubs can be widened to include some non-Meccano matters for the added interest of members. The other day I was reading the Newsletter of the Carleton Meccano Club out there in Poulton-le-Fylde and was interested to learn that the Club organised a trip to the Levens Hall Steam Engine Museum at Carnforth, Lancs., in March. They also plan a Kite-Flying Contest during the summer and are studying the possibilities of a Photo Competition as well. It's just these sort of things which keep a young club alive and successful, therefore I can see that the Carleton Club will be going strong for a long time to come.





Illustrated on the front cover of last month's Meccano Magazine was a magnificent Hammerhead Crane built by M.M. reader S. L. Harris of Plymouth, Devon. Mr. Harris has now supplied us with some interesting details of his model so read on here about a . . .

HAMMERHEAD CRANE by S. L. Harris

WHEN I became the proud owner of my very first Meccano Set at the ripe old age of eight, the Instructions Manuals packed with each Outfit featured a Block-setting Crane of one sort or another. Ever since then my imagination has been fired by the possibilities of this type of model, but it is only within the past year that I have been able to attempt construction of anything so impressive as the fine Block-setting Crane, described in Leaflet No. 7 of the series of Special Model Leaflets for Outfit No. 10. Attempt construction I did, however, and, as readers of last month's M.M. will have seen from the front cover, a modified model based on the No. 10 Outfit example was finally completed.

Above: The original Meccano Block-setting Crane featured in Special Model Leaflet No. 7.

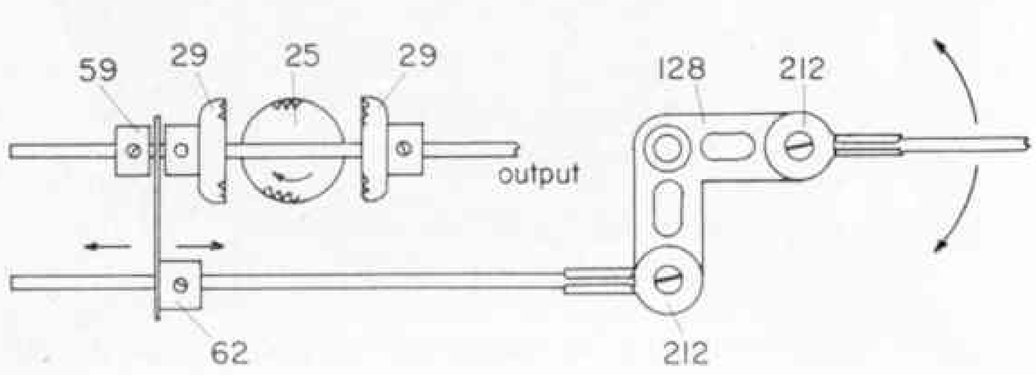
Below left: Diagram 1 showing the reversing gear system.

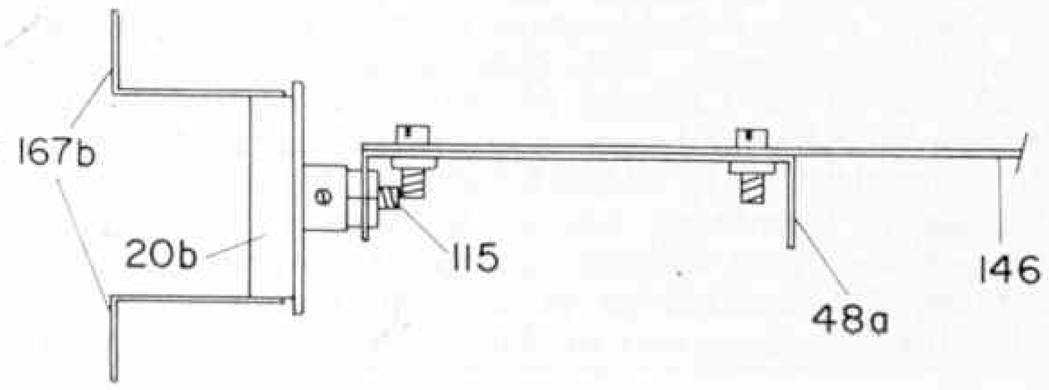
Below: Diagram 2 showing the original turntable roller.

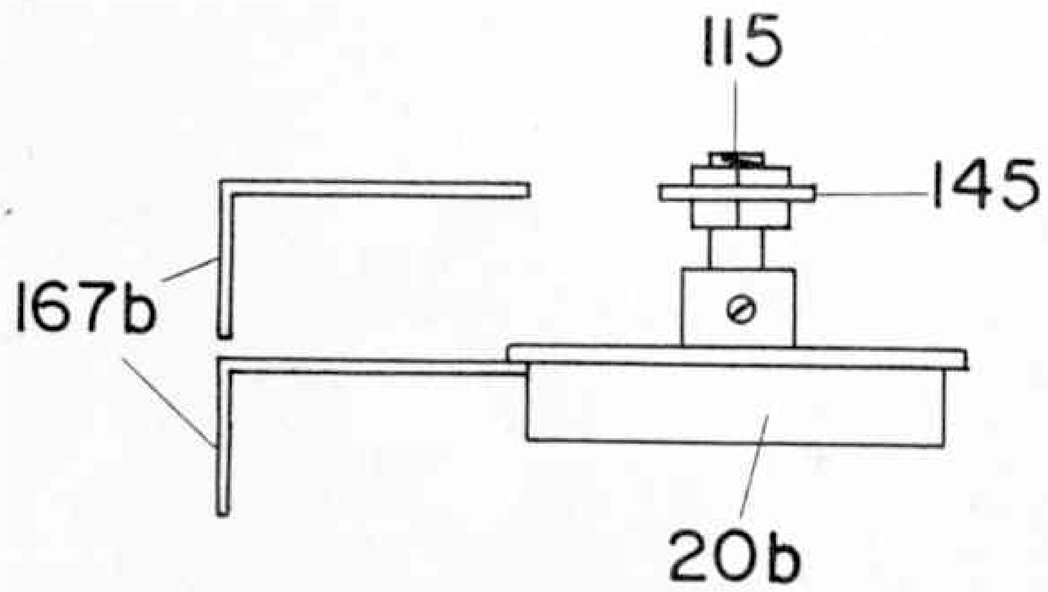
Meccano's original model as featured in Leaflet No. 7 is illustrated here. My first major modification to it was to double the height of the tower which was quite simply done by building a near-duplicate section, inverted above the original. This tall tower is braced in such a way as to make it twist proof—very necessary for accurate control of the hook movements.

The second major modification was the dismantling of a fair proportion of the crane to insert a form of "leg" which can be seen in the centre of the top half of the tower. The leg is fitted with a Ball Race, Part Number 168, at its lower end. During this operation it was found that the turntable rollers would prove more effective if orientated from their original horizontal position to the vertical position (see diagrams 2 and 3). One may ask how the weight of the boom, etc., is carried in such a way. The fact is that the whole weight is supported by the Ball Race via the "leg," the rollers serving only to centralize the boom and to counteract a toppling force as experienced during load-lift. On completion of this modification, measurements of the deflection of the boom end were taken while raising a two and a half pound weight off the ground. Total movement from rest to full load was found to be 3/32 in.—about one-sixth of the original deflection and a great improvement on it.

As the crane is rather heavier than the original







Left: Diagram 3 showing Mr. Harris' modified turntable roller.
Below: A photograph of Mr. Harris's modified hammerhead crane " on site ".
Bottom left: At first glance this may appear to be yet another photograph of the model, but it is in fact the full-sized version.

(total weight thirty pounds) four extra ground wheels are fitted, one to each tower foot although only two driven wheels are used to move the crane along the ground.

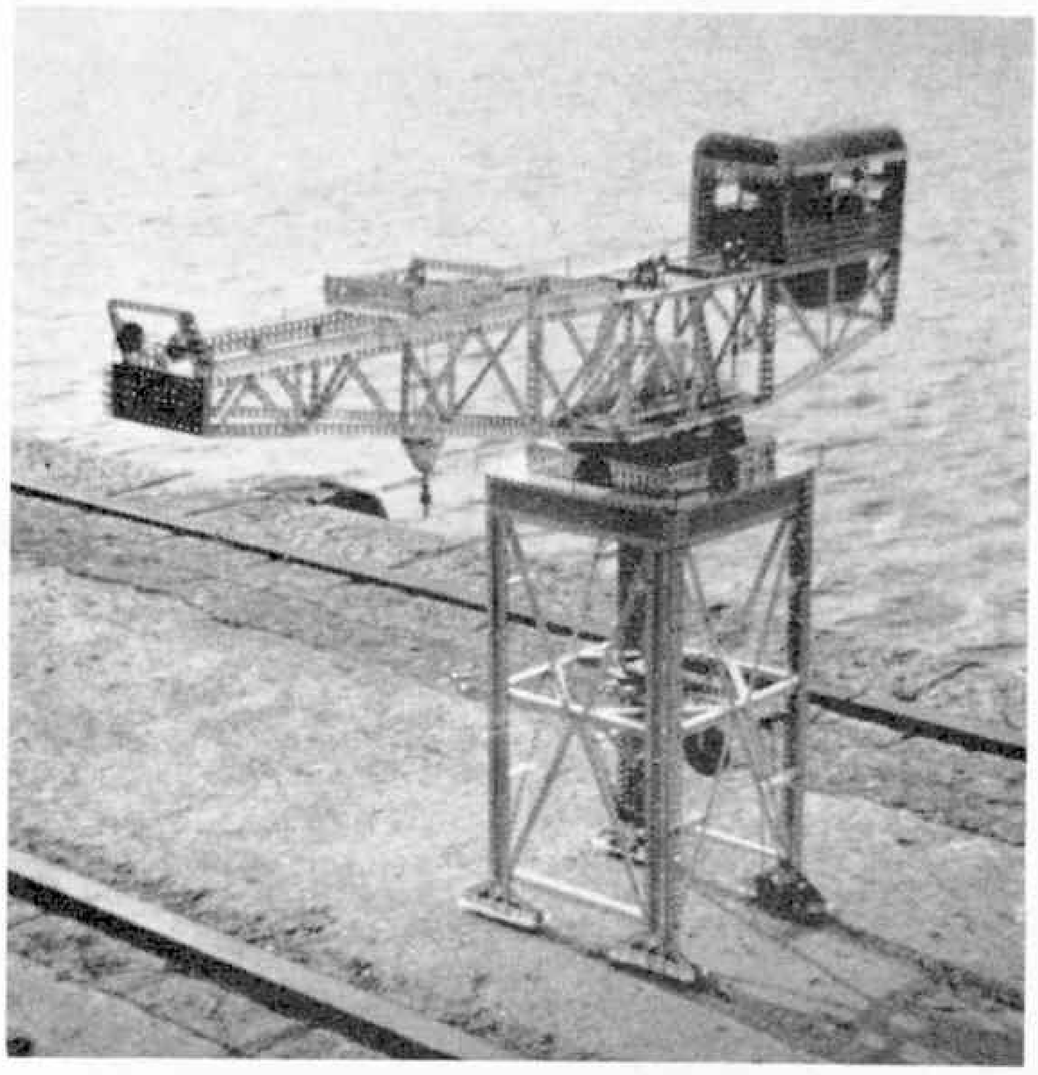
Still built-in to the Crane are the four movements performed by the original, namely (1) travel along the ground, (2) rotation of the boom, (3) movement of the boom carriage, and (4) hoisting of the hook, The similarity ceases there, however, as these movements are each fitted with its own reverse gear. In use, the motor is switched on and runs free until the appropriate movement selector lever is operated. One lever for each movement is brought out to the rear of the winch house and, when each lever is in the central position, no gear is engaged. To bring a gear into operation, the respective lever is moved either up or down depending on the direction required and the simple reversing gear arrangement used is shown in diagram 1. The operation of any movement selector is entirely independent of the others, thus any selectors can be engaged or reversed at any instant without affecting the operation of another movement, which is the essence of true crane operation.

Out of forty-three gears and sprockets in the model, the gearbox in the winch house contains twenty-six gears and sprockets. The gear ratios are arranged so that, from a constant-speed source, the speed of the movements are fairly realistic. The speeds of operation for each movement are: (1) ground movement, $3\frac{1}{2}$ in. per minute; (2) one revolution of the boom, $4\frac{1}{2}$ minutes; (3) boom carriage travel, 1 ft. 9 in. per minute; (4) hook movement, 9 in. per minute.

Motive power for all movements of the Crane comes from a Power Drive Unit, mounted above the gear box. It is set at a ratio of 30 : 1 and operates off a 6 volt battery housed in the container under the winch house. The motor easily supplies enough power to operate all parts simultaneously and lift a $2\frac{1}{2}$ lb. weight. As an experiment the crane was tested for its maximum lifting capacity, which was found to be a gallon of water in a container (about $10\frac{1}{2}$ lb.). Extra to the lifting tackle of the original model was another pulley sheave making three sheaves in all. Unfortunately, part number 57b in the Meccano system, the large loaded hook, has been discontinued, so I set about making my own out of a $1\frac{7}{8}$ long by $\frac{5}{8}$ in. diameter brass bar.

Drive for the boom rotation is brought forward from the gear-box through a right-angled drive and down to a 2 : 1 reduction gearbox, on the output shaft of which a 1 in. Sprocket Wheel is fixed. The Sprocket Chain around the tower is relatively slack and so, to prevent the chain sliding around aimlessly, two non-Meccano bolts were filed to a point and placed on opposite sides, to provide adequate grip.

Drive for the ground wheels is again brought from

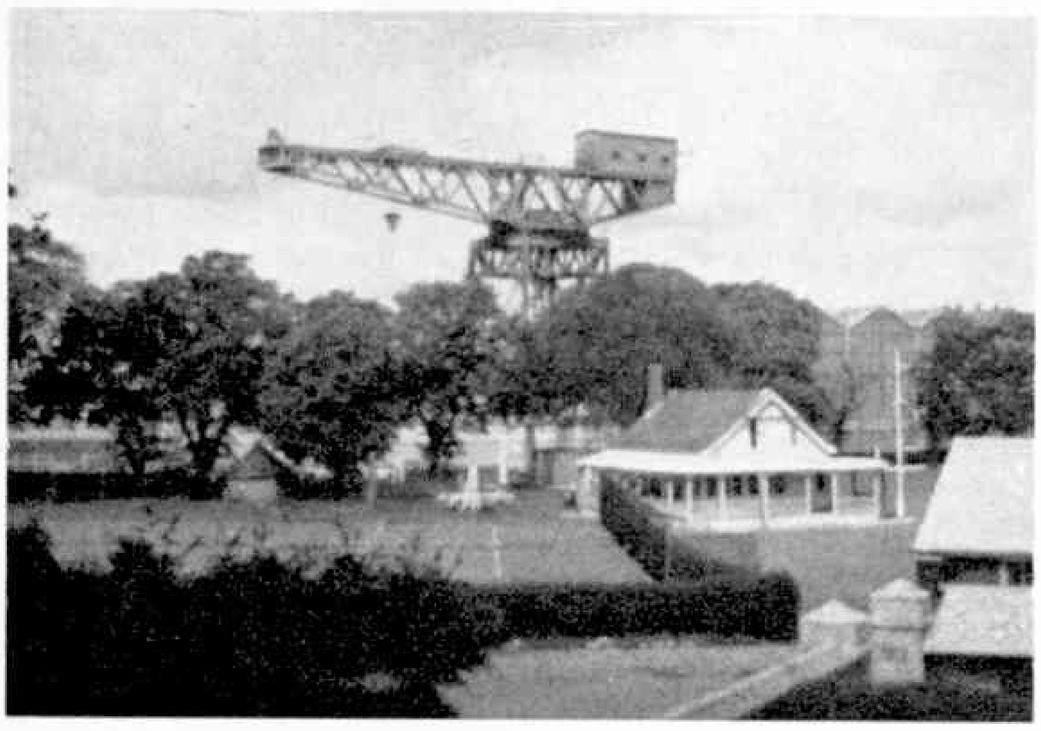


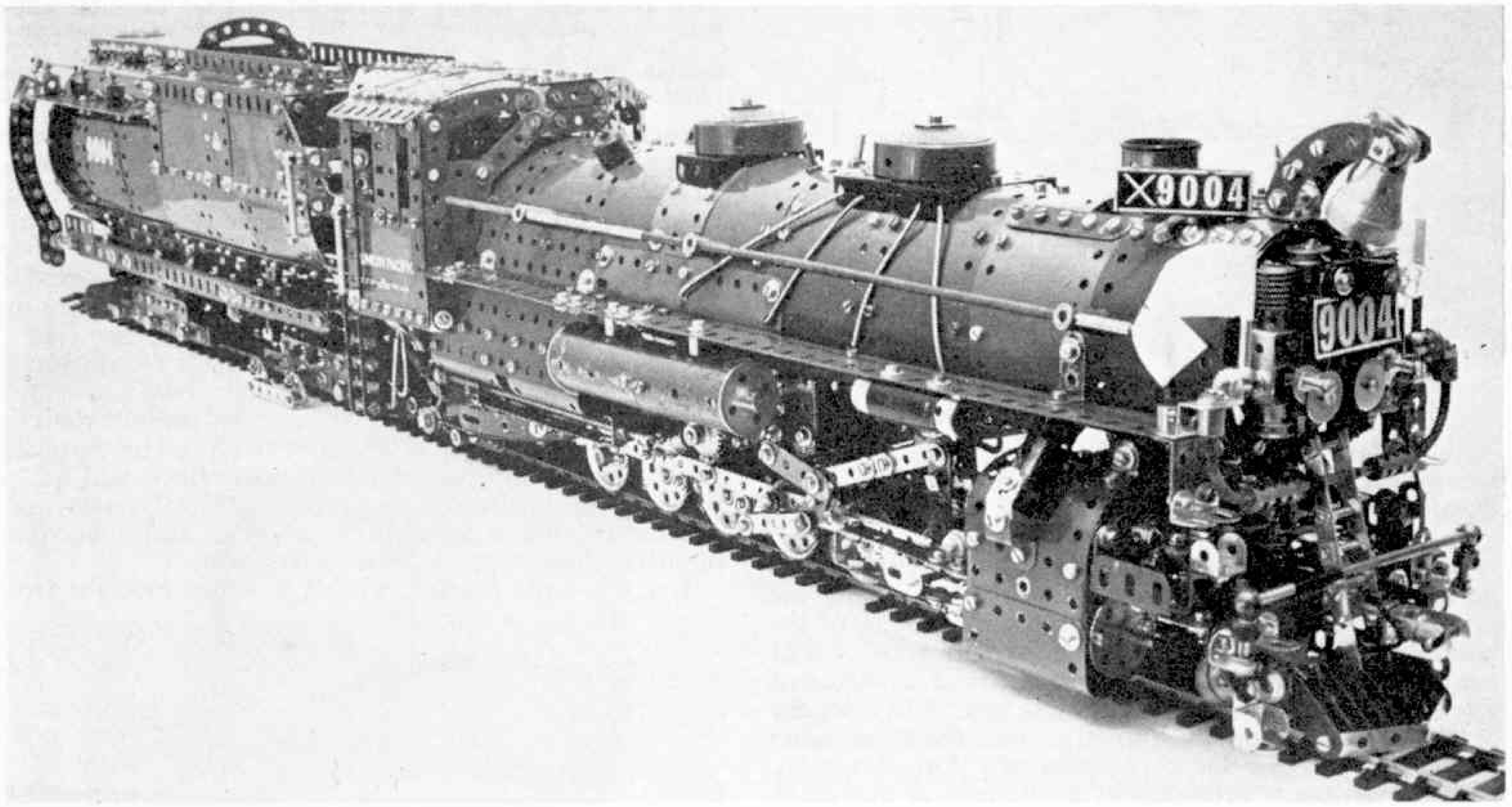
the gearbox through a right-angled drive but is taken right down the middle of the " leg " through the Ball Race to another right-angled drive, on the shaft of which a $\frac{3}{4}$ in. Sprocket is fixed. This drives a 3 in. Sprocket on a shaft that extends the width of the tower and near the extremities of which further $\frac{3}{4}$ in. Sprockets are mounted. From here the Chains drop down to 1 in. Sprockets on the shafts of the two ground wheels to complete the drive to the ground wheels.

The model stands 3 ft. 8 in. high, and the boom, excluding the selector levers, is 4 ft. 7 in. long. It is made up of approximately 3,000 parts, 1,500 of which are Nuts and Bolts.

As a matter of interest, the large crane effect given in the photograph on the front cover of the July issue was obtained by placing the camera as close to the ground as possible at a distance of about 12 ft. The photograph was the result of countless enjoyable hours of calculation, construction, after-thought and reconstruction and now the model will soon be dismantled to make way for another yet to be built.

The photograph was taken in Milbay Docks by kind permission of the Dock Manager.





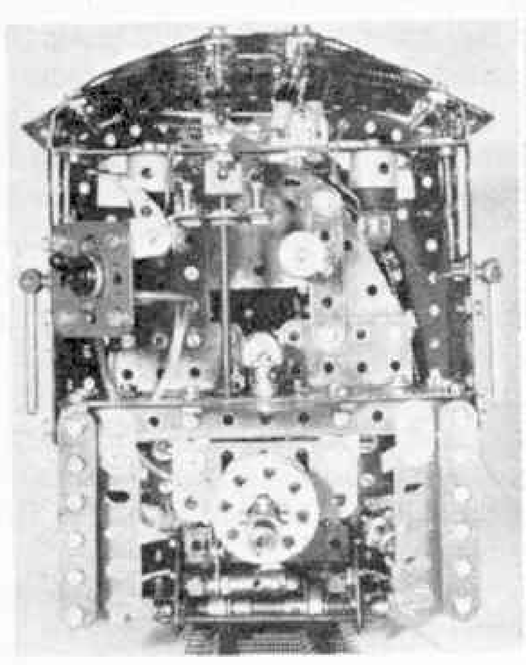
A mighty American Freight Loco' designed, built and described by G. M. HYLAND

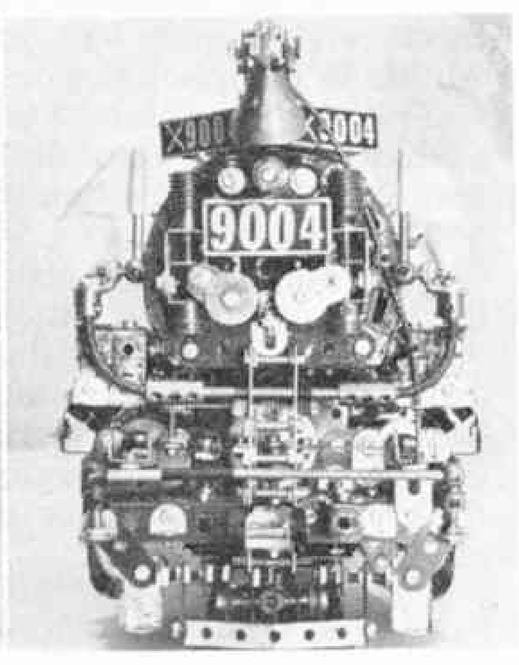
U.S. GIANT IN MECCANO

ONLY A few short months ago, British Rail officially killed-off steam on Britain's state-owned railway system and already a nostalgia for the lost world of steam traction is growing in this country. In the United States, on the other hand, steam has been dead, not for a few months, but for something like 9 or 10 years and so the feeling among enthusiasts out there has had more than enough time to grow from nostalgia into a sort of cult.

It could be said that American devotees of steam have lost more than their British counterparts because American steam locomotives were so much larger, more rugged-looking and certainly more "open to view" than most of the locos used in this country. This may or may not be true, but the rugged nature of U.S. locomotives undoubtedly makes them ideal modelling subjects, particularly for Meccano. It was this fact which started me on the loco illustrated in the accompanying photographs, which is based on a Union Pacific 3-cylindered 9000 class engine, with a 4-12-2 wheel arrangement, that was used on the Union Pacific Railroad for fast freight haulage. These locos were fitted with the Gresley 3-cylinder conjugated valve motion to give extra power over the more usual 2-cylinder engines.

The model was built to run on O gauge track and despite being 3 ft. 9 in. long, 8½ in. high and 6¾ in. wide, it can negotiate 14 ft. radius curves. The





Left: Quite a lot of "equipment" could generally be found on the front of American steam locomotives and this head-on view of the model gives some idea of what this equipment was. Here you see the bell, headlamps, pumps and part of the Gresley valve gear as well as a ladder, the cow-catcher, a pair of flags and the male section of the front automatic coupling.

Far left: A view of the cab or, to quote the American term, "backhead", showing, among other things, the lighting, brake screw, reverse control (½ in. Pulley), stoker and trailing truck. To the right of the trailing truck can be seen the Universal Coupling which connects the tender and drives to the coupled wheels.

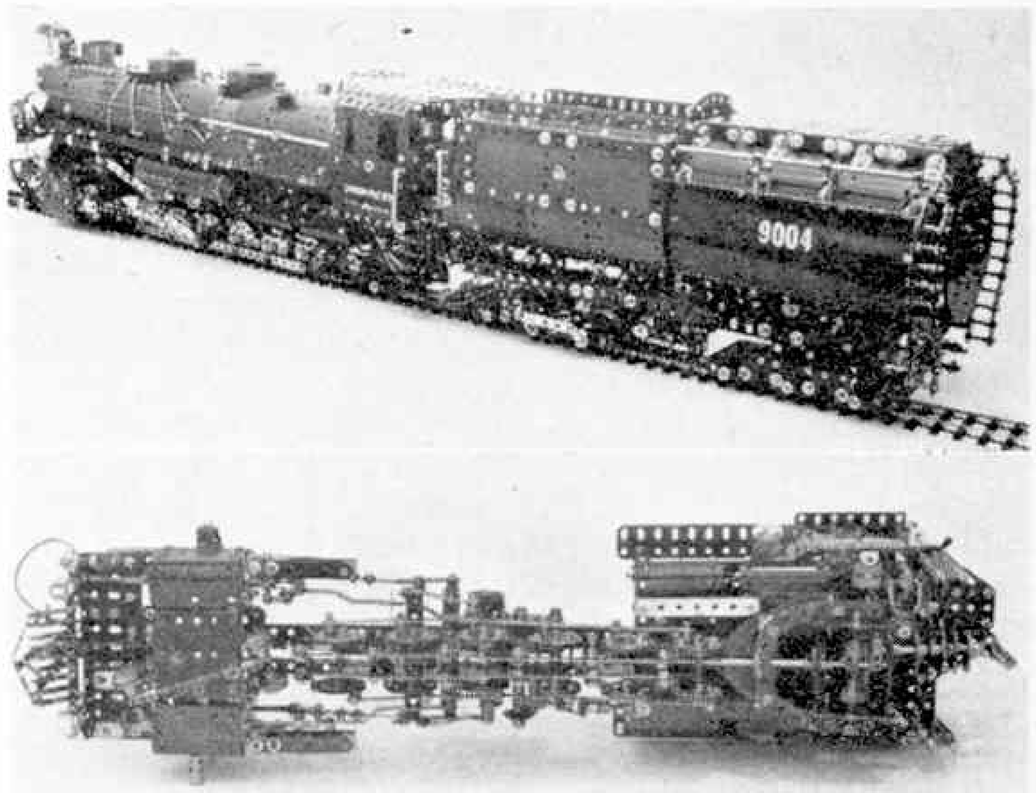
dimensions, by the way, show that it is slightly over-proportioned. The number 9004 was chosen because this was the number given to one of approximately ten locos to be fitted with Tender Truck Boosters in real life. All numbering and lettering on the model was done with dry print lettering.

The model started as an experiment to see if a Meccano construction could be made to pull rolling stock carrying loads of up to 42 lb. In the past, I had used both six and eight coupled wheel arrangements with very little success. Looking back through many back number railway magazine issues, I found the 12-coupled loco, which wheel arrangement offered a greater distribution of axle loads and so, with tractive effort and adhesion factor in mind, I set forth on what was to be a project of trial and error but which ended up reasonably successfully.

Power is supplied by a 12 volt Taycol Motor mounted beneath a 1 in. layer of coal stuck on a board. As this motor has its base holes out of line with Meccano parts, it had to be clamped in place with Fishplates and Angle Brackets. The drive is taken from the motor to a Dog Clutch secured by Socket Couplings and Bush Wheels, this Clutch allowing the motor to run free when required. From there the drive goes through a 4 : 1 reduction gear supplied by a $\frac{7}{16}$ in. Pinion and a 60-teeth Gear, into the gearbox. The gearbox itself is a 4-speed, gate-change unit "borrowed" from a past issue of Meccano Magazine, with the difference that the selector rods are spring-loaded to prevent the gears from crashing. The object of this gearbox is to enable a suitable speed for a particular load to be selected when the loco is stationary as neither it nor the clutch can be operated when the motor is running because the torque would only cause damage.

With the use of 1 in. gears on the output shaft of the gearbox, the drive is split two ways, one going to the main coupled wheels and the other to the Booster, both drives passing under the tender and making use of universal couplings in plenty. Between engine and tender the drive to the coupled wheels has been given end play to allow the locomotive to negotiate curves. This drive passes below the right-hand side of the firebox and, using Bevel Gears, enters a second gearbox, this one having forward and reverse as well as another 4 : 1 reduction ratio. From here the drive is taken through 1 in. Sprocket Wheels and Chain to the fourth coupled axle from the lead end. It will be noticed that this fourth axle is the only one to receive tractive effort from the motor, tractive effort to the other axles being conveyed by the coupling rods, supplied by $2\frac{1}{2}$ in. Narrow Strips. These Strips take the full thrust when the locomotive is in motion. Outside cylinders on the full-size 9000's, as they were known, drove on the third axle while the centre cylinder drove on the second, this system being known as "divided drive."

For the benefit of readers who may wonder what a "Booster" is, it was a small 2-cylinder auxiliary steam engine used, when starting off with heavy loads, to give increased tractive effort. On the model, the mechanism, which is based on the Franklin type, is driven through a 2 : 1 ratio, using a $\frac{3}{4}$ in. Pinion and a $1\frac{1}{2}$ in. Contrate Wheel. From the Booster, the drive is continued through a series of five $\frac{1}{2}$ in. Pinions to a $3\frac{1}{2}$ in. Rod carrying two Eccentrics for the cylinders, as well as a $\frac{3}{4}$ in. Sprocket Wheel connected by Chain to another $\frac{3}{4}$ in. Sprocket Wheel on the centre axle of the bogie, the first axle being only an idler. Drive to the trailing axle is taken through outside built-up cranks and coupling rods, the latter again supplied by $2\frac{1}{2}$ in. Narrow Strips, whereas the former are Rod Sockets to which Fishplates are secured. Each crank is weighted with a Collar to assist momentum as, indeed, are the main coupled wheels.



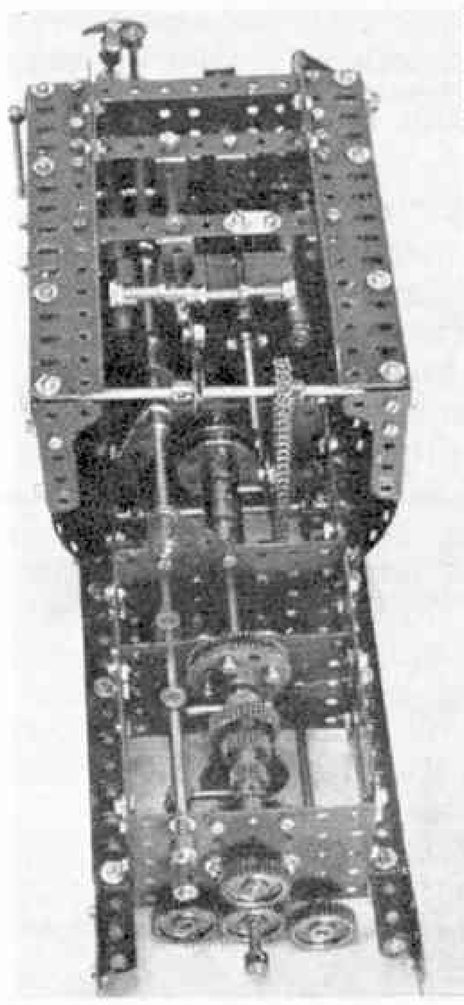
Upper: Another impressive general view of the locomotive giving a very good impression of the rugged quality of the original. The booster with its cylinders can be clearly seen at the front end of the tender.

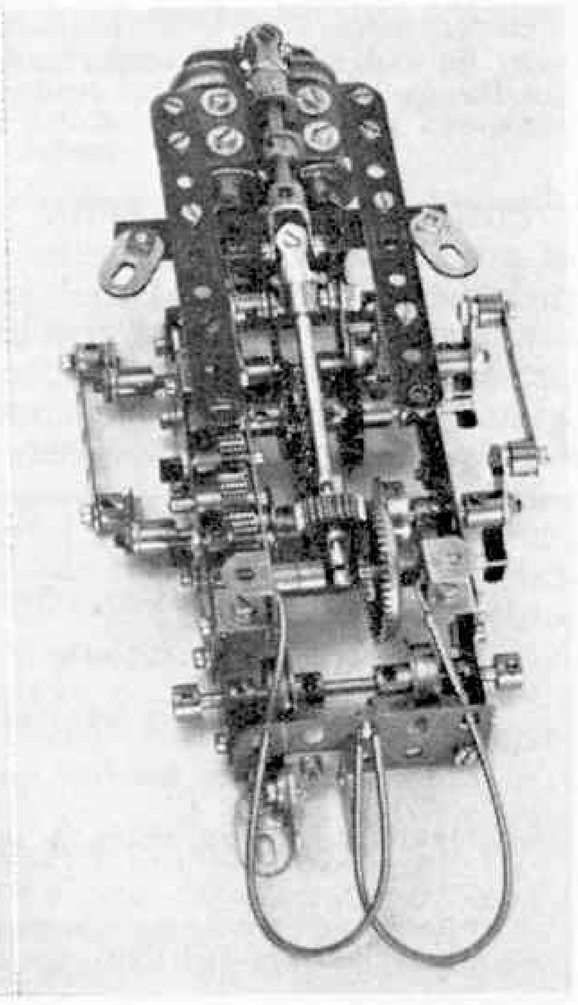
Lower: An underside view of the engine bed showing wheels and motion, brakes and bogie.

Coming to the Gresley 2 : 1 conjugated valve motion, this, on the model, consists of End Bearings secured to the ends of the valve spindles which protrude from the front end of each Cylinder. The End Bearings are linked together by a $1\frac{1}{2}$ in., a $2\frac{1}{2}$ in. and a 3 in. Strip, the $2\frac{1}{2}$ in. Strip being attached to, but raised above, the 3 in. Strip by Double Brackets to result in a $4\frac{1}{2}$ in. lever which has its fulcrum on the centre of the pilot beam. As the 3 in. Strip is connected to the valve

Below right: In this close-up view of the booster as seen from above, the $2\frac{1}{2}$ x $2\frac{1}{2}$ in. Flat Plate and pivot have been removed to show internal detail.

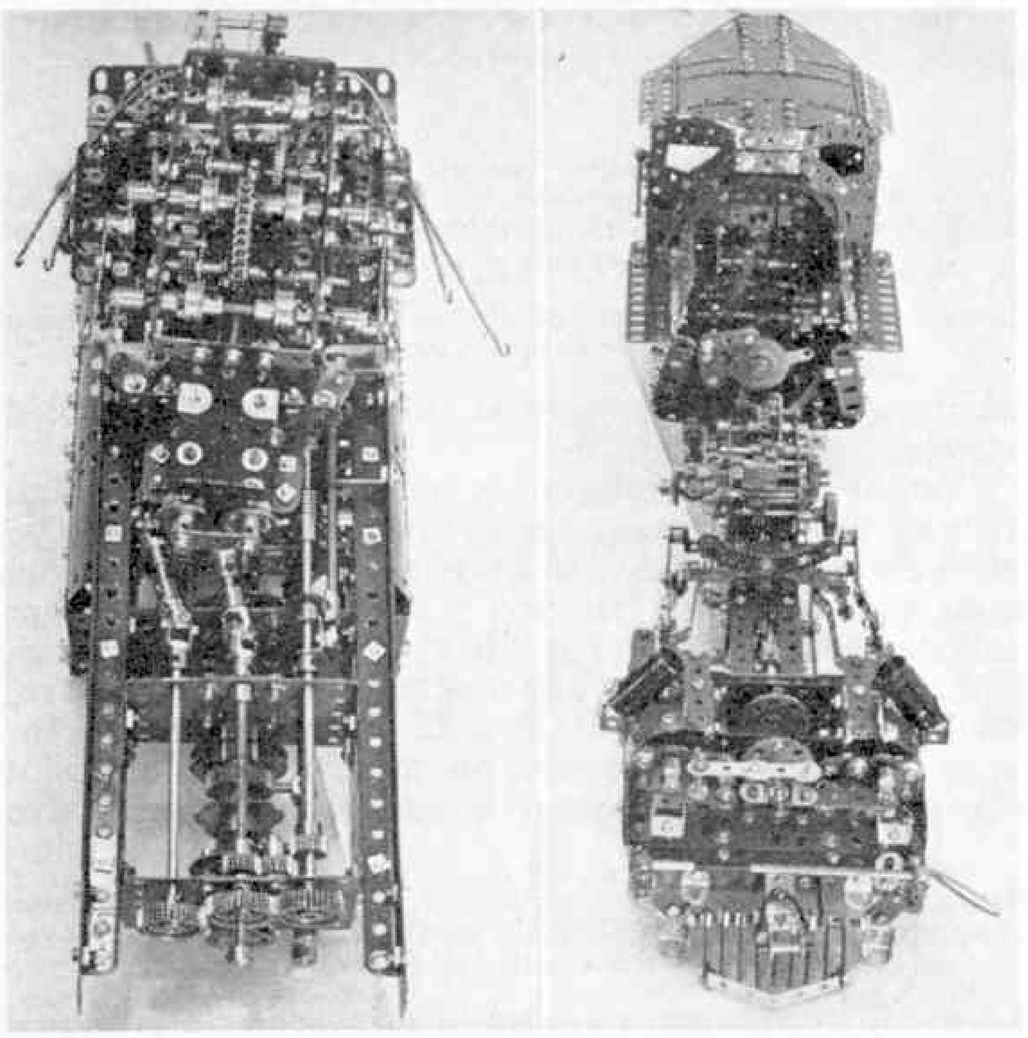
Below left: In this high rear view of the tender, the cylindrical water tank has been removed to show the 4-speed gearbox, Socket Couplings housing the dog clutch, coal pusher and drive Chain. The special main-drive motor can also be seen at the front of the tender.





spindle of the left-hand cylinder and the 2½ in. Strip is connected to the centre of the 1½ in. Strip which links the right and centre cylinder valve spindles, a floating pivot results.

Fitted inside the firebox is an E20R Electric Motor (an E15R Motor would do equally as well), the purposes of which is to drive the mechanical stoker running between the tender and the firebox. Power to the stoker is taken across the footplate and through the cab floor by ¾ in. Contrate Wheels and Pinions. The stoker itself consists of Bush Wheels which rotate slowly, performing the motions of the original. Secured to one end of the stoker is a Universal Coupling carrying a Rod which trails beneath the tender. Mounted on this Rod is a Worm, a ½ in. Pinion and a drive Sprocket fitted with Chain running up into the rear of the coal bunker where an eccentric operates the coal pusher.



Right: A top view of the model with the boiler removed to show the engine bed, the forward and reverse gearbox, the cylinder saddle, Gresley valve gear and male section of the automatic coupling. Note the Meccano Motor in the firebox section.

Left: An underside view of the tender with the booster attached, but the water tank and rear tender truck removed to show the numerous gears and drive shafts built in to this part of the model.

Fittings to increase realism are included in the form of a bell and lights. The bell, which is cast brass, is rocked by Spring Cord trailing down through the pilot beam and connected to the left-hand cylinder. This causes the bell to rock when the locomotive is in motion. Mounted inside the cab are two lamps which not only supply cab lighting but, when illuminated in the dark, also give a very good effect of the glow thrown from an open fire door. The lamps are powered by a 4½ volt battery which also supplied the power for the main headlamp. Current for the main motors, incidentally, is picked up from the conductor rails by two ½ in. Pulleys, both of which are insulated by fibre.

Mounted on the front of the smokebox are two pumps, each produced from Sleeve Pieces, Chimney Adaptors, Double Brackets, ½ in. Pulleys with Boss and Worms. The bottom of the smokebox is squared off to clear the cylinder saddle, this being a feature of the full-size 9000's as, among other things, it permitted easy maintenance of the valve gear. A small door should have been placed between the pumps but, as space was limited, it had to be omitted. The smoke stack or chimney is a 2½ in. Cylinder, inside which an aluminium sleeve is inserted to permit real smoke to be used.

The engine bed frame consists of two 18½ in. Angle Girders spaced ½ in. apart, with axle bearing plates being supplied by 3 × 1½ in. Flat Plates, the same type of Plates also being used for the reverse gearbox housing. Brakes are fitted to the frame, each brake being a 1½ in. Strip fixed in place by lock-nuts with an Angle Bracket being bolted on to form the brake shoe. All the brakes are coupled together and can be applied by operating the brake screw control inside the cab.

The locomotive is fitted with an automatic coupling which enables it to back down on to its train and couple up without any manual assistance. Allowances have been made for the locomotive to slip when starting off under a heavy load. Slipping can be controlled by reducing the input voltage to the motor and, when the wheels begin to grip again, the voltage should be increased very slowly to give an effect very similar to that of a real locomotive. The following figures are the results of vigorous tests which taxed the motor to its extreme limits. Tests aside, however, such heavy treatment should be avoided as it will cause considerable wear on mechanical parts and harm to the motor brushes, but the locomotive can, with ease, cope with the speed ratings and, if limited to 30 lb., can move away with ease in first and second gears.

LOCOMOTIVE DATA

Weight of Engine 16 lbs.
Weight of Tender 16 lbs.
Total 32 lbs.
Total Weight in working order 35 lbs. — 2½ stone.
The additional 3 lbs. weight is taken up by coal, battery and other small oddities for realistic effects.

Tractive Effort with Booster engaged:

Tractive Effort 6 lbs.
Adhesion factor 3 1/3 lbs.
Total Weight on driving wheels and Booster 20 lbs.

Without Booster:

Tractive Effort 4 1/6 lbs.
Adhesion factor 3.
Total weight on coupled wheels 12½ lbs.

TEST RESULT

Speeds	First	Second	Third	Fourth
Ratios of Main Driving Wheels	144 : 1	96 : 1	48 : 1	16 : 1
Ratios of Booster Wheels	72 : 1	48 : 1	24 : 1	8 : 1
Load pulled without Booster on level track	42 lbs.	28 lbs.	14 lbs.	4 2/3 lbs.
Load pulled with Booster on level track	56 lbs.	38 2/3 lbs.	19 1/3 lbs.	6 2/9 lbs.
Maximum speed reached light engine, on level track (Approx.)	391 1/9 yds. p.h.	586 2/3 yds. p.h.	1,173 1/3 yds. p.h.	2 m.p.h.
Maximum gradient climbed in inches, with Booster engaged applied light engine only.	1" in 18"	1" in 24"	1" in 34"	1" in 7u

Camping, continued from page 400

needs. The cost 12s. 6d., but there are ones a lot cheaper. Another essential item of course is a light of some kind. A small torch will do at a pinch, but a lantern, if you have room is a great help for giving good illumination at night. We used our "Tildawn" one (see "Have you seen" February 1969) and considered it well worth taking.

Clothes

Stout shoes are of course a must, even when the weather seems settled, be prepared for rain. Take a warm pullover and a couple of pairs of spare socks, not to mention a plastic mac or anorak.

Although jeans are excellent for general wear, surprising enough they are not very good for camping. They aren't particularly warm or waterproof and when soaked take a long time to dry. Corduroy trousers or cavalry twill types are far better. "T" shirts take up little space and weigh next to nothing, ideal for the odd hot, sunny day.

Do's and Don'ts

Do plan your weekend well in advance. Make a list of everything you need, and carefully check all your equipment. Take a first-aid outfit and a tin opener. (If you've ever tried to open a tin by hitting it with a stone you will realise the importance of this one!) Don't drink stream water, if no fresh tap water is available, boil clear stream water for a few minutes to sterilise it. Do tell someone where you are going. Just in case of an accident. Whenever possible, camp on a recognised site, apart from the amenities available, it's far more fun to camp with a crowd. You can always get help or advice from experienced campers, something you can't do if you are all by yourself. You may find a farmer who will allow you to pitch your tent for a night or two, but always check first. Never move into a field without permission, you can't just camp anywhere. Most ground is owned by someone and pitching your tent just anywhere could land you in trouble.

Once again, *never* light your stove inside your tent for any reason, particularly if it's a very small one. Generally small tents aren't particularly fire-proof and the canvas will catch fire with amazing speed.

Don't leave any field gates open, and finally deposit your litter in a bin, or if there isn't one near, take it with you until you find one.

Making a start

The main question as yet left unanswered is, "how do I meet other people with an interest in camping?" To meet and satisfy these needs is one of the main objectives of the *Camping Club of Great Britain and Ireland Ltd.*

All the equipment shown in the photograph packed easily into the Rucksac shown, and was easily carried by one person.

This organisation (of which your Editor is a member) is devoted to the interests of all campers. Whether they use tents, trailers or caravans. It was started in 1901 by a small group of cycle-camping enthusiasts. Today the club boasts thousands of members of all ages, and with a variety of interests, however, we are mainly concerned with activities for the junior light weight campers, and of course the Camping Club caters for them. The "Camping Club Youth" section is open to young people of both sexes, between the ages of 12 and 18. Entrance fee is 1/- and annual subscription 5/-.

Members receive a free list of approved camp sites, and the name and addresses of secretaries of the Regional Councils. Inside the Club there are sub-sections to cater for those members who are interested in a variety of outdoor hobbies, such as hiking, canoeing, cycling and photography. Benefits and full details are numerous and anyone interested in learning more about this excellent organisation are invited to write to: The Camping Club, 11 Lower Grosvenor Place, London, S.W.1.

"N" Gauge cont.—from page 387

All that remains to be done now is to hinge the legs to the baseboard. Use square flap hinges, screwing them on the top of the legs first, then turning the baseboard upside down, fix the legs into position on 2 in. by 2 in. blocks of wood screwed into the corners of the framework. There should be a $\frac{7}{8}$ in. space between the outside edge of each leg and the inside of the baseboard side members. Cut two stays for each leg from 2 in. by 1 in. wood, to extend about halfway down the leg and about the same distance along the side of the baseboard frame. These are secured into position from the outside of the leg to the inside of the frame with long countersunk screws—or if the baseboard is to be portable—with stout bolts.

Two or more baseboards can be joined together either by the obvious method of bolts and wing nuts through adjacent holes drilled through the end cross-members, or by flap-back hinges as shown in Fig. 2. The latter are certainly more accurate, and probably the most convenient if it is required to take the layout down rapidly, since all that has to be done is to pull out the steel wire peg which replaces the original hinge pin. This pin can be removed simply by tapping it out of the hinge with a suitable centre-punch and a hammer. The replacement hinge pin can be a large nail of the right diameter to provide a close fit, and bent to give a handle. Line up the baseboards to be joined and firmly clamp together with "G" cramps. Each half of the hinge can then be accurately screwed on the side of their respective boards with the peg in position for good alignment.

Finally, if pulp board or chip board is used, the edges should be protected by pinning lengths of $2\frac{1}{2}$ in. wide hardboard all round the exposed edges of the baseboard flush with the top surface.

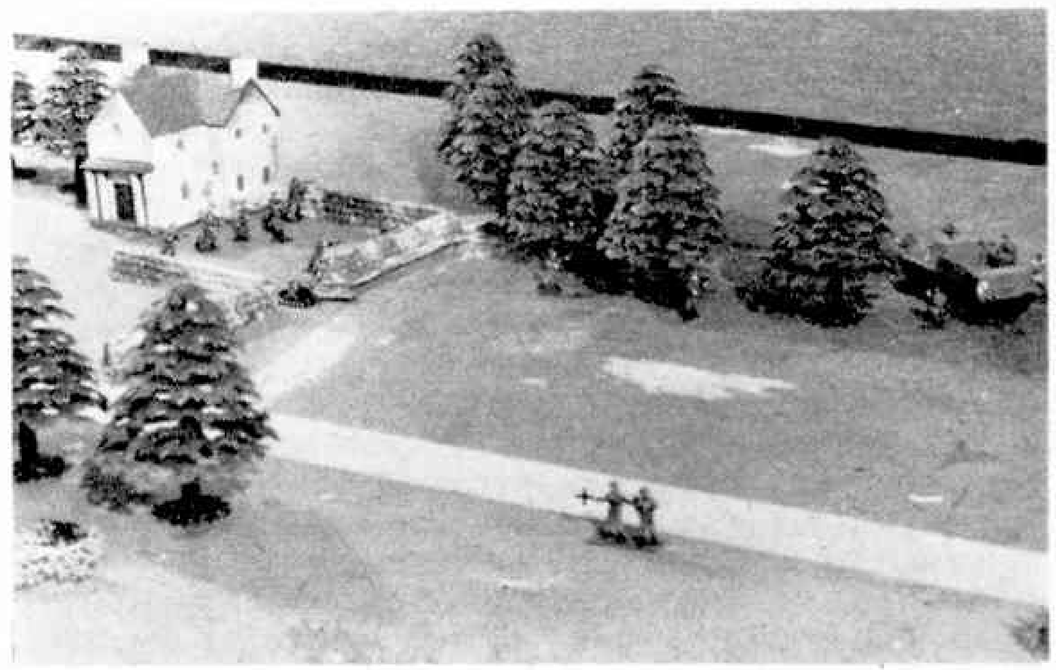
To be continued

BATTLE

Part XVI

Action at Twin Farms

by Charles Grant



FOR THE demonstration of our basic infantry rules, a fairly simple scheme was devised, this involving a body of infantry in a prepared position awaiting the approach of an enemy reconnaissance group.

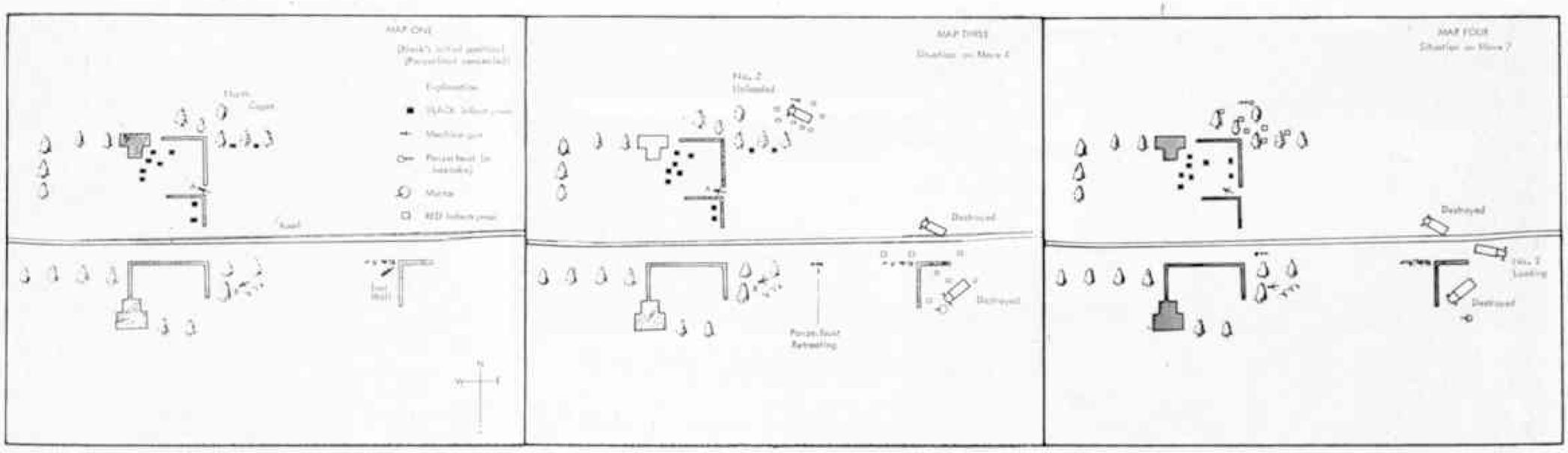
Dealing first with the defence of the position—of which the details may be gathered from the plans and photograph—it was entrusted to BLACK, whose troops, in appearance were somewhat Germanic, numbered an officer, nine riflemen, one Panzerfaust and two heavy machine guns, with appropriate two man crews, of course. His task was to defend the two farm buildings, which were fortunate enough to have some excellent cover in the shape of substantial stone walls as well as wooded areas. The whole complex was known as "Twin Farms"—not terribly original, but it will suffice. All in all it was a very fair position and the defence took every opportunity to exploit it, infantry and machine guns being disposed as shown in Map One, while the Panzerfaust team—greatly daring—was hidden behind the East Wall—as it was known—well in advance of BLACK's main defence line. An excellent spot for an ambush, thought BLACK (and he was right!).

The RED attacking force—we're nothing if not original—consisted initially of one group of half-tracked infantry such as was declared in Part XV, and totalled an officer, 2 N.C.O.'s, 12 riflemen, 6 sub-machine gunners, 2 bazookas and a mortar, plus crews. They were to enter the wargame table, which, for the purpose of this exercise measured 5 ft. by 3½ ft., from the east, and, being at the outset 'off' the table, knew nothing of BLACK's disposition. Visibility was determined in the approved fashion by throwing two dice, this giving a pretty average result—20 in. unaided and 30 in. aided.

And so RED made his first move, his three half-tracks, Nos. 1, 2 and 3—spaced at 2 in. intervals—coming along the road from the eastern edge of the table their full 15 in. road move, this bringing the leading vehicle right up to the stone wall behind which lurked BLACK's Panzerfaust men. In accordance with the rules governing defending troops who have elected to remain in hiding, their position had previously been written down by BLACK, and RED was consequently ignorant of their whereabouts until their position had been declared and they had been placed on the table. It was, nevertheless, rather rash of him to come hammering straight up the road without having a thought to a possible ambush. When RED's half-tracks had come up, BLACK, having in effect, nothing to move, simply declared the position of his Panzerfaust, putting it in the requisite spot. As it was within 6 in. of the leading half-track, he let fly at it without hesitation. The throw for a hit (6 at this range) was easily obtained and the effect throw—also with two dice—followed rapidly. This totalled 7, which with the Panzerfaust Strike Value at this range, 3 in. to 6 in., of 6, made 13, effectively destroying the half-track, its Defence Value being but 11. Nor was this all, for, when a troop carrying vehicle is 'brewed up' in this fashion, all the men therein have to be thrown for as possible casualties—1, 2 and 3 and they are O.K., 4, 5 and 6 and they have to be removed as 'dead'. In the present case, when this was done, RED had lost an officer, three riflemen and a bazooka team, leaving only a single rifleman and two sub-machine-gunners as survivors from the personnel carried in the half-track. The latter is placed on its side, to indicate its destruction, and the surviving troops put down within 2 in. of it, on the side away from the source of the trouble. A splendid beginning for BLACK, and no mistake.

Immediately—that is, on Move 2—RED took prompt action, his No. 2 truck veering off the road to the north, moving 9 in. across country, while No. 3 moved up the road for 5 in. and to its left 6 in. towards the wall sheltering the Panzerfaust, the idea apparently being to outflank the latter on both sides. (You can see how the combined road/overland move is worked out—1/3 on the road—5 in., leaving two thirds at cross country speed, or 6 in.). As it happened, RED reckoned without his host, whose Panzerfaust switched targets and, drawing a bead on No. 3 half-track, scored a hit, and followed this with an effect throw of 14, three in excess of the appropriate Defence Value. Thus No. 3 half-track was well and truly destroyed. This was pretty terrific, and General BLACK's jubilation can be imagined. The crew of this half-track was more fortunate than that of the first, only 2 riflemen and one sub-machine gunner being lost, leaving an NCO, 2 riflemen, one sub-machine-gunner, and the mortar and crew to be stationed beside their shattered conveyance. Meantime, the riflemen and one of the tommy gunners who had escaped from the first vehicle made a forward move (3 in.), firing at the Panzerfaust team, but they were unsuccessful, both throwing 5, a 6 being required, as the target, behind the wall, had the benefit of hard cover (touch and go, though!).

On Move 3, half-track No. 3, the only one still serviceable, moved 9 in. towards North Copse, and all the RED infantry, including the mortar team, moved 3 in. towards the ambush point. The BLACK



Panzerfaust, however, decided to call it a day and moved back along the hedge (3 in.). Here it was very lucky again, a rifleman and a tommy-gunner failing to register a hit, while indeed this forward move on RED's part brought a sub-machine gunner and the mortar team—south of East Wall—into range of BLACK machine gun 'B', which opened up at once, putting paid to the sub-machine gunner, but failing to hit the mortar crew. (Both SMG and mortar were just inside the MG cone of fire—distant section). By this time, of course, both sides were well within view of each other, and RED had a good idea of the strength of his enemy's position.

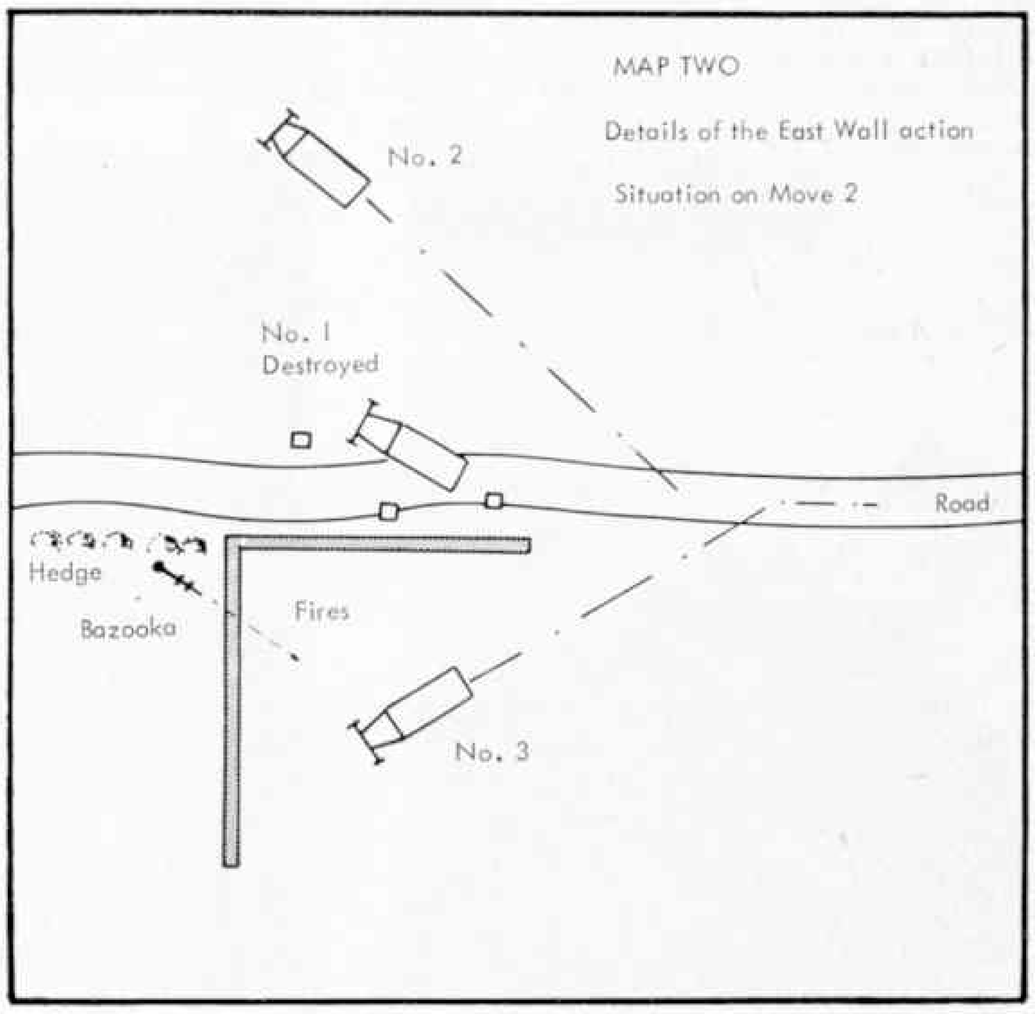
After its escape, RED mortar—move 4 now— lost no time in moving back 3 in. out of MG range, and the BLACK Panzerfaust also continued to retreat. It was in the open now but its luck still held out, the leading RED rifleman, on this move reaching the end of the hedge, threw a miserable 1, and one of his comrades, arriving at the East Wall, getting a 4, not enough at extreme range (6 in. to 9 in.). This rifleman himself was safe from BLACK's MG, being behind the hard cover provided by the wall. On RED right, the half-track (No. 2) unloaded, but the two BLACK riflemen in the wood had retired 3 in. towards the safety of their own lines, behind the wall of North Farm, where the bulk of BLACK's infantry was stationed.

Move 5 then: the Panzerfaust crew continued their retreat, missed again by the RED riflemen at the East Wall. (They really were prodigiously lucky.) One of the riflemen from No. 2 half-track was bold enough to emerge a little from the trees and also had an unsuccessful crack at them. In doing so he unfortunately revealed himself to BLACK MG 'A', which fired and promptly cut him down (the MG threw a 6). Deciding he would utilise his one and only half-track to bring up his men from the East Wall, RED started it in that direction (9 in. move across country, again). In the copse the BLACK riflemen made another 3 in. move backwards, while RED infantry continued their advance through the Copse.

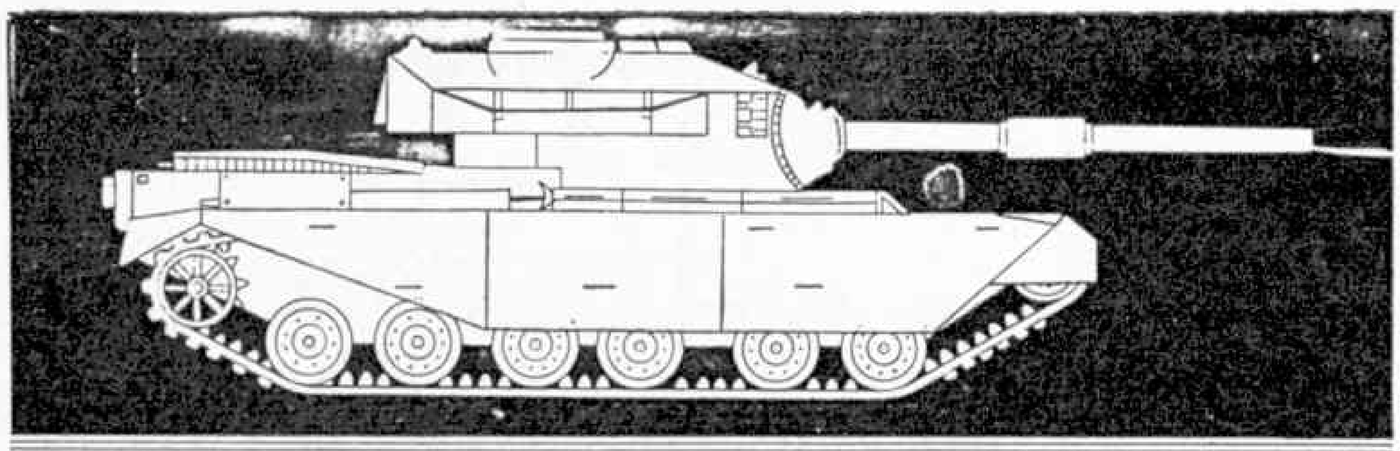
Next move—number 6—the Panzerfaust men, greatly to their relief (and the promise of at least an Iron Cross 4th Class) reached their own lines, while their two riflemen friends in North Copse still retreated, pressed by the RED infantry. At the East Wall RED troops began to close up on their half-track which, on this move, had reached the west side of the Wall. RED mortar now opened up on BLACK machine gun 'B', but its ranging shot—a 3—was no good, a 5 or a 6 being required.

Firing again on Move 7, during which the RED riflemen about East Wall began to board the half-track, or at least those who were within 2 in. thereof, RED mortar failed again with its ranging shot on BLACK MG 'B' (a wretched 1 was thrown, in fact). There was no other firing, and this point we might call the end of the first phase of the operation. RED infantry have suffered a set-back, of that there is no doubt, although they are well established in North Copse, consolidating a jumping-off point for an attack on North Farm. The others will quickly be inside their half-track, ready to move forward, yet even so it is evident that RED has really not a strong enough force to carry on with his attack, but still, after all, his mission was really one of reconnaissance only. Reinforcements must then be summoned, and the question is, just of what would they be likely to consist—another Battle Group of infantry, an assault gun or two, or what? RED could ask for artillery fire to be brought down on BLACK's position as well.

This is the problem, then, to resolve which RED has to make a quick decision. Meantime, we have gone a little way towards a practical illustration of how an infantry encounter is staged, and if any reader would like to carry on with a sequel, I should be glad to hear of it and of the reinforcements used. Indeed it might well be that at a future date the action will be continued, when we have established additional rules to enable us to cope with the situation with more sophisticated forces.



Heading photo shows Black's Panzerfaust making all speed to get back to safety. The maps above and right show progress of the war game.



MILITARIA

A REVIEW BY CHARLES GRANT

ONE OF the most famous firms in the model soldier business—NORMAN NEWTON LTD. (188 Piccadilly, London, W.1)—has produced two excellent series of artillerymen of the Napoleonic times in the 54 mm. scale, one of French Horse Artillery of the Guard, the other of British Royal Horse Artillery. Each series consists of six different figures and they come in kit form, ready for assembly, costing 50/- per set of three figures. The six figures make up a complete gun crew, including an officer with a " perspective glass " in the case of the French set, plus gunners with linstock, rammer, buckets and so on. The photograph will give an idea of how good these figures are. Certainly, with the complete crew costing £5, one cannot hope to assemble an entire battery without being in the higher income bracket, but as a special sort of exhibition piece—given a good cannon such as one of the Hinchcliffe types for them to be grouped around—these figures are well worth being considered by the collector, particularly the one with a special interest in artillery uniforms. They would be a worthy addition to any display cabinet. I'd like to point out that, for the model soldier collector, the wargamer, or for anyone interested in any sort of militaria, this firm's new premises at " Tradition ", 188 Piccadilly, W.1, are a ' must ' for a visit from any enthusiast living in or visiting London. Indeed I'd go so far as to put at the top of any sort of priority list for such excursions. Not only are Norman Newton figures obtainable but so are those of pretty well every other manufacturer, from Britain's toy soldiers of fifty years ago to the modern 20 mm. Airfix types. There are ranks of display cases containing medals and decorations, racks of antique pistols, genuine and reproduction, and indeed, just name it, " Tradition " will most probably have it.

The latest edition of the Roco " Minitanks Manual " (MODEL HOBBY PRODUCTS LTD., Mebro Works, Cuckoo Hall Lane, London, N.9) is a first-rate ten shillings' worth. In addition to being a catalogue—illustrated with photographs and diagrams—of the tremendous range of armoured fighting vehicles produced by Minitanks—both of the models and their prototypes—it provides a great deal of very useful information—invaluable for the wargamer in the popular period—concerning weapon capabilities and armour specifications of pretty well every World War II tank and gun one can think of, plus the same information for subsequent types, right up to the present day Chieftain and Leopard. Also included—very useful for wargamers—are charts of the organisational details of various armoured formations of the Great Powers, both of World War II and the present time. As a concise, handy book, with a mass of information, the Minitanks Manual is without doubt really excellent value. Incidentally, when describing it as a catalogue, I was guilty of the use of a bit of a misnomer; no prices are given of Minitanks, these being found in the price list which costs 6d. (Most model shops have them.)

It is a very real pleasure to be able to devote a notice to " Willie Figures " (Edward SUREN, 60 Lower Sloane Street, London, S.W.3) as they are, without doubt, the finest 30 mm. figures obtainable, and the photographs of his latest line—Black Watch of about the middle-eighteenth century time—really do them no justice whatsoever. In detail of moulding and of historical accuracy there is simply no criticism to be made, and ' Ted ' Suren has created a most individualistic style of modelling which gives each figure an identity of its own. Anyone who has had the opportunity of seeing the artist—and I use the word deliberately—creating his " masters ", will marvel at the skill and technique involved. For myself, I just watched open-mouthed. Even with this sort of quality, prices are very reasonable, I feel—the unpainted infantryman costing 4/6 (sadly, a bob of this goes in tax and what have you), and while it might take a longish time, and a bit of hard saving, to build up an army, certainly it is worth while to have at least an ' elite ' unit of " Willie " figures, or possibly one's generals and staff. The " Willie ' showroom, at the address given above, should be visited, if only to see the wide range of figures, ranging from Barbary Pirates, through the Eighteenth Century and Napoleonic Wars, to a fine selection of Crimean and Zulu War types. Have a look, too, at the personalities—Cardinal Richelieu, Prince Rupert, Marlborough, Lord Cardigan and many others. A hard job saying which is the best.

Not so well known possibly as other military model manufacturers, but most certainly in a class by itself, is the firm of DENZIL SKINNER & CO. LTD. (Phoenix Works, Hartley Wintney, Basingstoke, Hants), which produces the most accurate miniatures in 1/96 scale, of all sorts of armoured fighting vehicles. The medium used is not the ubiquitous plastic, but solid satisfying metal—a pleasure to handle them after long being accustomed to the lighter modern counterparts. In scale and detail the Denzil Skinner models are splendid, and to go with them the firm also produces metal soldiers, in the same scale, at 6d. each. This is a good thing, as the normal Airfix figure, so commonly used, is just a little too large for the Denzil Skinner scale and by the side of one of their tanks looks a little incongruous. The rub, of course is that, being metal, the cost is regrettably greater than their plastic counterparts—most of the tanks being priced at 10/-, the larger ones, the Stalin and the Panther for instance, being a couple of shillings more. One can also get absolutely super jobs, the

Below left: Another of the very useful " Minitanks " Manuals—good value for modern wargamers.

Below: A selection of the splendid " Willie " figures of the Black watch.

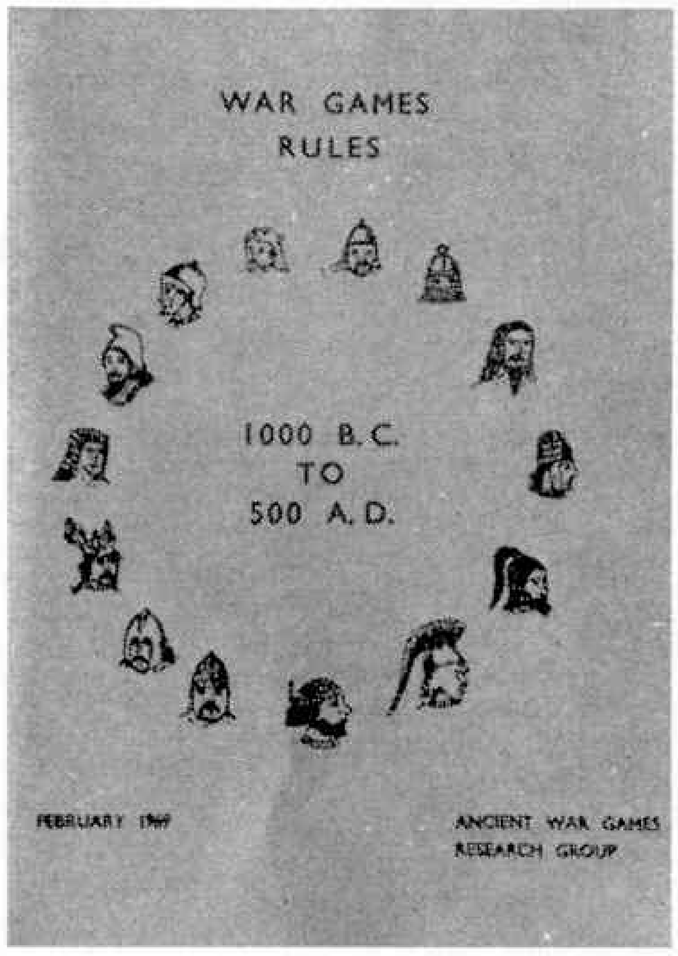
60-ton Antar and trailer at 35/- comes to mind, and the 25 pdr. gun, on the other hand, you can get for 5/-. These models are really for the wargamer who wishes to work on small actions—the platoon and company strength game—rather than for the one who floods his table with unrealistic masses of tanks and guns, all huddled together much too closely to provide a good game. At any rate, Denzil Skinner does supply an illustrated catalogue which is worthy of study, and the models themselves can, from time to time, be seen in the bigger London stores, like Hamleys of Regent Street.

From the ANCIENT WAR GAMES RESEARCH GROUP comes a well produced set of wargame rules set in the period 1000 B.C. to 100 A.D. These are very nicely printed in loose-leaf form, held together by a spring back clip, a convenient idea if additions to the rules are contemplated, or if one's own notes are to be inserted. These rules, by the way, are those to be used for the 'ancient' section of the National War Games Convention to be held in Worthing, Sussex, in October of this year. (They can be obtained, price 8/6 from Bob O'Brien, 75 Ardingley Drive, Goring by Sea, Sussex). Without a doubt, a very considerable amount of research has gone into the compilation of these rules, and there is a definite 'feeling' for the period, but I suspect that they have been put together rather hurriedly at the last moment to make them available as soon as possible for intending contestants in the October competitions. At times, they seem to verge on the over-complex—when deciding upon a unit's morale—or Reaction Test, as it is called—no less than 25 possible factors have to be considered! This seems a bit much, particularly for a competition game. I would feel like challenging, too, one or two principles the authors state—that cavalry charge at the gallop for the last 150 yards of their charge, or that the javelin has no greater range than the Roman pilum. No provision seems to have been made—bearing in mind the possibility of Ancient British armies appearing—for the transport of warriors

Above: Some of the all-metal armoured vehicles produced by Denzil Skinner Ltd.
Right: A selection of Norman Newton's Napoleonic artillerymen.

in chariots, nor for their mounting or dismounting, or for how many can be carried in each chariot. On the credit side, however, there is a goodly amount to be said, in spite of the above—there are useful suggestions on forming an 'ancient' army and on the correctness of its composition, and, most of all, the insistence that written rules must be adhered to throughout the game. All in all, with the authors taking a little more time to do a little polishing-up here and there and to fill in an occasional gap (what about the possibility of war-elephants stampeding?), and by taking advantage of their first-rate loose-leaf system to make the necessary additions and corrections, the rules should form the basis for a really excellent 'ancient' wargame.

Useful additions to the BELLONA MILITARY PUBLICATIONS (Hawthorn Hill, Bracknell, Berks.) are two manuals on military fieldworks, one dealing with the 18th and 19th Centuries, the other with the 20th. Both are lavishly illustrated with line drawings—by William Holmes—of pretty well every type of defence that troops in the field can put up, plus details of temporary bridges, shelters, camp kitchens, not forgetting what might be called the 'usual offices'. The two manuals should be of great interest to the collector specialising in action groups of figures or dioramas—I was highly tempted myself by a "Zareba" from the 1884 Sudan fighting. For the wargamer, though, just



one small 'beef'—nothing is said as to the time required to construct the works. It would be an advantage from the point of view of rules just to know how long it takes to throw up revetted entrenchments, for example. At 8/- for the 20th Century volume and 5/- for the other, though, they are good value, and, incidentally, a stamped addressed envelope to the firm will bring a list of all the numerous Bellona publications.

Top right: The dust-jacket of a Von Senger Und Etterlin.
Above "War Game Rules" of the ancient period.

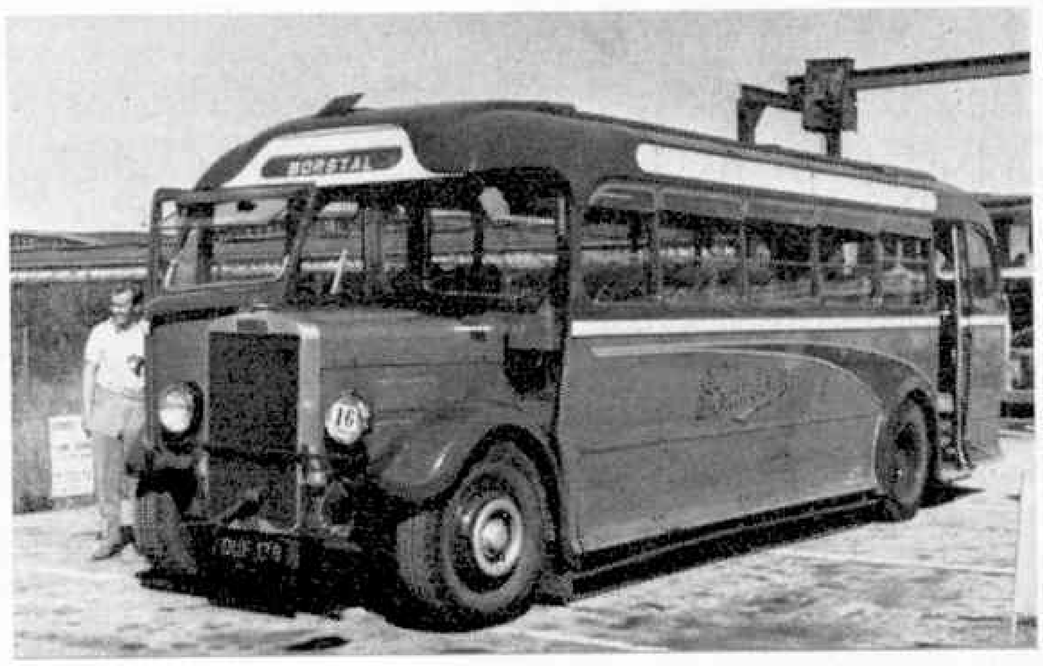
German Tanks of World War II
The complete illustrated history of German armoured fighting vehicles 1926–1945
F.M. von Senger und Etterlin

I can only describe "German Tanks of World War II" by F. M. Von Senger und Etterlin (ARMS AND ARMOUR PRESS, 677 Finchley Road, London, N.W.2) as a sumptuous volume, indeed, to use the current idiom, it is quite fabulous. The author is, of course, a world authority on armoured fighting vehicles, and this book, translated from the German by J. Lucas of the Imperial War Museum, and edited by two such tank experts as Peter Chamberlain and Chris Ellis, has all the hallmarks of authority and authenticity. The arrangement of the text is excellent, the first part being a straightforward and readable narrative of the development and production of everything from the PzKw to the Tiger, as well as a very good section on armoured cars. The style of writing is especially clear and understandable, so many such books being such heavy going that the mind simply cannot absorb the welter of technical facts. These—and they are exhaustive—fill numerous appendices, and the photographs and diagrams are more than adequate. I hope all this doesn't sound too much like a rhapsody of praise, but I think it true to say that, with this book in hand, no further authority need be sought on German tanks of World War II. It goes without saying, naturally, that the price for such a book will inevitably be a little high—it being, in fact, 95/-. A lot of money, without a doubt, but it's worth every penny, and if it comes hard to save such a dollop, there must be a complaisant relative around whose arm can be twisted as a birthday or some other suitable anniversary approaches! Try it, I hope you are lucky.

A TRIP TO THE SEASIDE

by

John Brewer



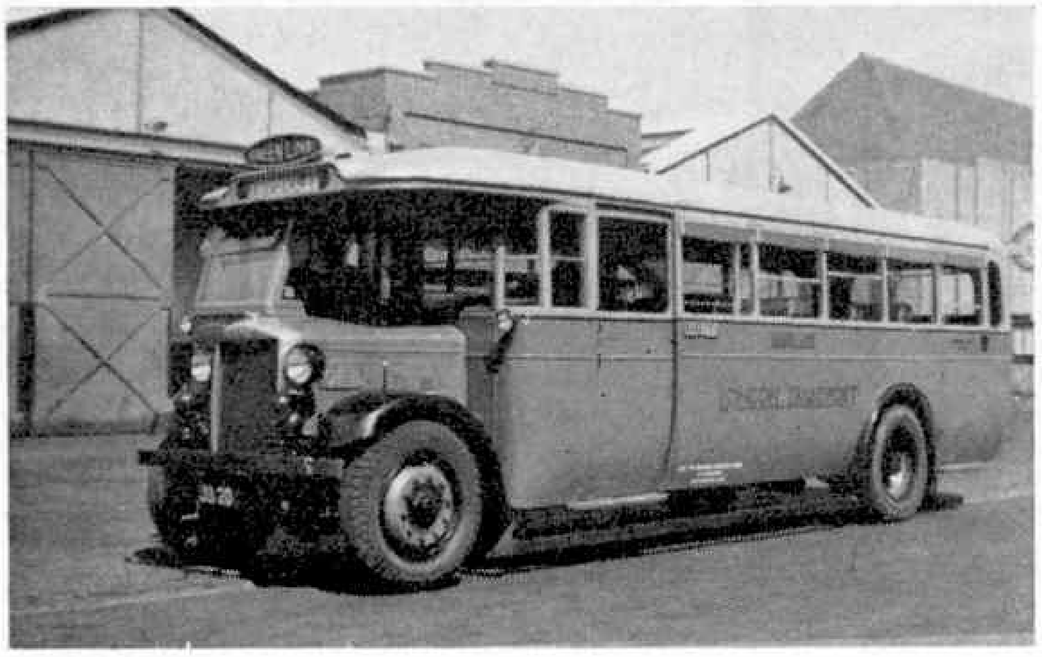
Above: DUF 179, a well known Southdown Leyland, now preserved.

Below: This Gilford was once used on early Green Line Services.

ALTHOUGH THE history of the bus is very well documented, the story of the pleasure motor coach is rather more obscure. Nearly every *Meccano Magazine* reader must, at one time or other, have sampled the delights of a "coach tour", probably from a seaside resort whilst on holiday. When did the idea begin? The Victorians probably thought of it first, as many plush hotels in those spacious days used to keep a horse brake which would venture into the countryside on day trips with a load of sight-seeing passengers, all equipped with hampers, enormous picnic lunches etc. This was probably the ancestor of the "coach party" as we know it and, for that matter, the Victorians really invented the family holiday as we understand it today.

The coming of the motor bus in the twentieth century made longer day trips possible, and the years following the Great War saw the hey day of the "char-a-banc" or "charas" as they were almost universally known to the day-tripping public. These vehicles seem crude in the extreme by today's luxury air-conditioned standards. They were virtually a traditional "Toastrack" tram type body mounted on a bus chassis; the rows of transverse seats had no doors, and were banked towards the rear of the vehicle in theatre style, so that those at the back could see the delights of the surrounding countryside. The combination of solid tyres and dusty roads does not seem to have dampened the enthusiasm of the travel-hungry trippers. Motor car ownership was very rare then, and the "charas" provided an intimate way of seeing the countryside more conveniently and at less cost than by train. Indeed, the rot started to set in for many rural railway branch lines at this period.

The 'twenties and 'thirties saw great improvements in motor coach design. Development of the coach went hand in hand with that of motor cars, with



smoother engines (some diesels in the 1930's) better suspensions and more luxurious interiors. Although the day of the completely open "charas" was over, most coaches had either "convertible" tops or sliding roofs; as with private cars, the customers were reluctant to abandon their love of the great outdoors—the weather *must* have been better in those days.

The really palmy days of "tripping" were the 1930's and the years immediately after the second world war. In retrospect, a romance has grown up around coach operation in those days which almost rivals that of the railways. Bank holidays would see literally thousands of coaches of all vintages and colours, motoring in convoy to such places as Blackpool, Brighton and Southend, full of that particularly British brand of city dweller who intends to have a good day out *at all costs*. Institutions were born; the mobile "sing-song" whilst hurtling through the dark on the homeward run; the (sometimes too frequent) stops for refreshment at roadside hostelries, the car parks of which took on the aspect of coach rallies, and that curious form of Bingo for which the driver would chalk numbered marks on the wall of the front tyre. If your number was lowermost at the next refreshment stop, you had the jackpot! More fun, and certainly more sociable, than travelling by train.

Widespread motor ownership of the 'fifties and 'sixties has gone far towards destroying the coach outing. Just as the coach was more convenient than the train, so the private car is now more so than the coach. Even today, though, a coach trip has much to commend it if you do not fancy driving, and modern coaches are often luxurious in the extreme. The motor coaches of the good old days have not been forgotten, however. Like vintage cars, they have their enthusiastic adherents who carefully preserve them, and some good examples can always be seen on the Historic Commercial Vehicle Club's annual run to Brighton. Chevrolets, Albions, Bedfords, all in their distinctive "fleet" colours, they always look so at home at Brighton, where so many of them would have visited in the days when they worked hard for their living. There was always something very personal and sociable about a coach, as opposed to its near relation the bus. Who ever heard of a sing-song on a bus—and who would tip a bus driver? On any normal summer day in 1969 the sea front at Brighton is lined with cars, with their cramped inhabitants eating sandwiches and peering morosely at the sea. Perhaps, when all is said and done, we have lost the art of really enjoying ourselves.

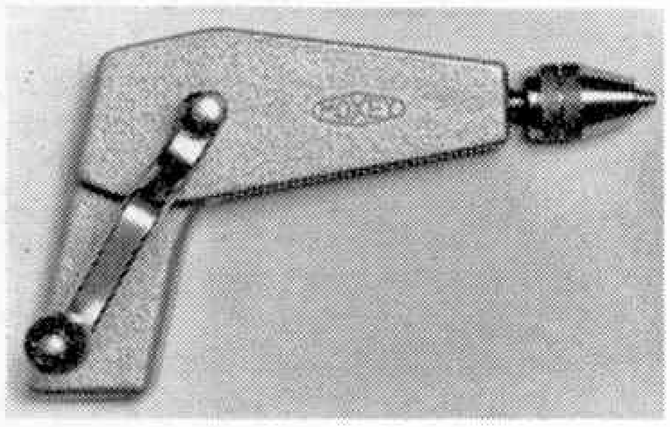
HAVE YOU SEEN ?

Moxey Encased-Gear Hand Drill

The Moxey Manufacturing Company have introduced a completely new type of hand drill. The open cogwheels which often pinch you between the thumb and first finger, have been put inside a strong aluminium case so preventing any painful accidents.

The new pistol shape of the case allows more forward pressure to be applied with the palm of the hand, and this also helps to keep the drill straight. The driving handle can be removed in a few seconds by unscrewing a knurled screw, and allows the drill to be easily stored in a compact space. The protected gears, made of oil impregnated cintered iron, are unlikely to need lubricating for some years but when this is necessary the case may be opened by simply unscrewing four screws exposing all parts.

We think that this drill is ideal for modelling and practical household tasks, and is very reasonable for 32s. 6d.



Corgi's Agricultural Gift Set

Corgi have yet again released one of their fine combination gift sets. This, the Agricultural Gift Set No. 9, features the popular Massey-Ferguson tractor and shovel, and the Farm Tipper Trailer.

The Tractor, finished in authentic red bodywork with a light grey radiator, is complete with movable shovel which can be raised and lowered on the rig. In addition to working parts and detail, the tractor, when pushed along makes the familiar "putt putt" engine noise.

The topper trailer is just as realistic with simulated hydrulic tipping mechanism and detachable raves at the front and the back for carrying farm produce such as hay. Corgi have successfully combined two of its most interesting agricultural models, and all for the reasonable price of 14s. 9d.

Corgi's Monkeemobile

The ever popular Monkees, with their self-styled show-car the Monkeemobile, have become the subject of one of Corgi's "Cars of the Stars" models.

The Monkeemobile is finished in fire-engine red and has a white convertible roof. Its bonnet is cut away to reveal the chrome supercharged engine protruding out at the front. Other chromed parts are headlights, air-intakes and the underneath of the front wheel arches. The interior is bright yellow and contains the singing, guitar playing Monkees —in model form unfortunately for the girls. Authentic mag wheels are fitted with extra wide tyres at the rear and smaller tyres at the front. To complete the model the Monkees' guitar insignia is on both the doors in bright yellow.

Your own way-out dragster for only 8/6d.

Dufix Adhesive

A new brand of multi-purpose adhesive has just been released on the market by I.C.I. Ltd. Called Dufix, it is available, ready to use, in an unbreakable polythene bottle. There are three bottle sizes, 2 and 4 fl. oz. size, and also a 1 pint cylindrical bottle. All bottles are supplied with a unique applicator, which is in fact the nozzle; gentle pressure on the bottle allows the adhesive to flow out in ribbons of varying sizes, from a thin line to a band ⅜ inch wide. This is produced by holding the bottle at different angles. Inside the cap there is a tongue which keeps the nozzle clear when the bottle is not in use, and can also be used for spreading the adhesive into awkward positions.

Simple and clean to use, Dufix can be used for adhering a number of materials; wood, paper, china, carpets, linoleum, plastics and fabrics. Apart from its adhesive uses, Dufix has other qualities. It can be used for mixing powder colours, sticking papier mache, sealing porous surfaces, and is also an effective filler.

We have tested this product, both at home and in the office. The results have been very satisfactory, and we recommend this as a worthwhile buy.

Kawasaki A6M5 Zero Sen-Zeke. 1/32 scale Revell

We were a little disappointed with this model, especially after reading the report on it in "Scale Modeller," the American magazine. The engine and cockpit detail were very good but for

such a big kit, we expected movable control surfaces. A very bad point was the difference in thickness of the tail-plane to the fuselage fairing, and the wing section was different to the fairing where it joined the fuselage. Another good point was the cockpit canopy, this was clear and movable too. Generally almost all the parts fitted well and the instructions were clear and concise. The only thing that let them down was a lack of colour scheme. You are told to paint this piece black and the piece silver, but I feel that most modellers, especially those in the early stages of kit building would welcome more concise colour details.

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THE HUMBROL STORY

IN 1919 A SMALL factory with a staff of four began to produce cycle oil and calcium carbide for use in vehicle lamps. This was the Humber Oil Company—the founder, Douglas S. Barton. His small business began to grow, slowly at first, and then in 1930 a little faster as the company extended its production to include black enamel for cycles. From this new enterprise they gained their first experience of exporting and began to realise the potential of their products. They then introduced the first midget tinlets of enamels in a limited range of twelve colours and soon established a reputation for their high quality products.

In 1939, with new premises and a larger staff, the Humber Oil Company began to supply cellulose lacquers for the many uses which war time Britain demanded. In 1941 the factory was destroyed and work came to a halt, but soon a temporary factory was set up and operating within six months.

When the war ended it became obvious that these premises would be completely inadequate for the company's ambitious development plans and so a site was purchased at Marfleet, near the Hull Docks, and a year later production was in full swing.

Mr. Gerald D. Barton, son of the founder, entered the company after service with the armed forces, and began working in the company laboratories. Always a keen modeller, he began to experiment with various formulae in a bid to produce a balsa cement which would satisfy his own critical needs. His samples were so much in advance of competitive products that it was suggested that it should be put on the market. Thus Britfix Balsa Cement was born—it is still produced today, but under another name—Humbrol.

In the early 1950's plastic modelling kits were introduced and the Humbrol tinlets of enamel began to sell to the model shops. The Humbrol formula was ideal for polystyrene plastic and the sales began to grow rapidly.

In 1959 a formula was produced which gave high covering power, a quick drying time, and, very important in the home, freedom from lead and other noxious ingredients. Thus Humbrol enamel could be used throughout the home with perfect safety for children and animals. From that time the use of the company's products began to grow, and today the $\frac{1}{2}$ ounce tinlets, together with their larger brothers, the 2 ounce and $\frac{1}{4}$ pint sizes are to be found throughout Britain, in the distinctive Humbrol Paint Lockers. In 1964 an aerosol filling line was installed and another successful product was launched. Always perfectionists, Humbrol technologists believe that a large part in the success story of their aerosols has been the special 'soft spray' head which they use. This, coupled with the high quality tradition to Humbrol enamels, and their rapid drying time, has brought the company a huge share of a market which is still growing rapidly today.

To watch automatic machines filling 300 cans of paint a minute or 50,000 tubes of adhesive today is a fascinating sight. The company's efficient factory employs sophisticated automated equipment on their production lines, and this sort of efficiency is necessary when one considers the colossal export trade carried on. Exports currently go out to well over eighty countries—indeed, in the first seven weeks of their Golden Jubilee year the company exported more than two million tins of enamel. In fact, one export order to France alone this year was greater than the total exports ten years ago!

The future seems limitless for this successful private company. With exports climbing at an almost astronomical rate, with their products known to every modeller in Britain (and much of the rest of the world, too), and with a large and growing share of the Do It Yourself markets, it is certain that the next fifty years of the company's history will be as exciting as the first half century.

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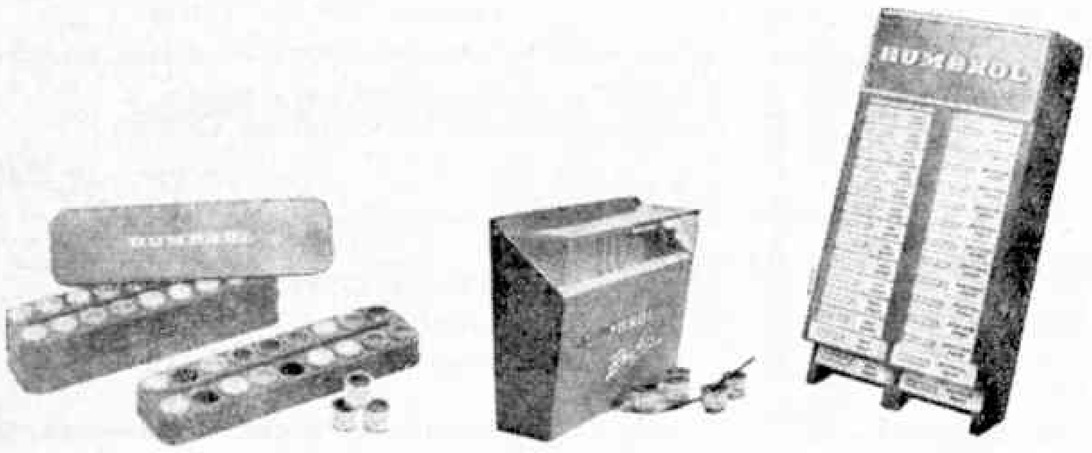

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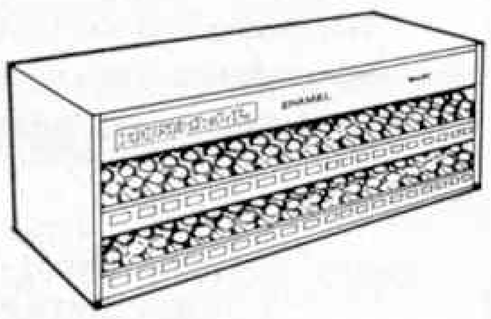

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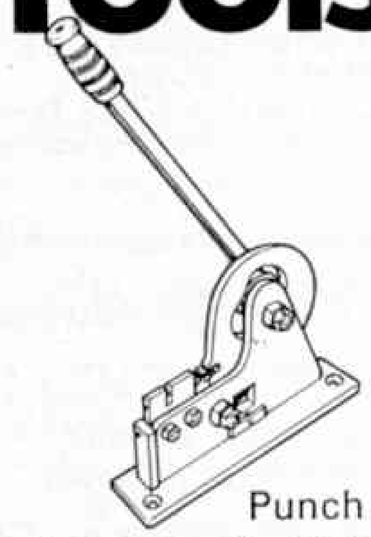

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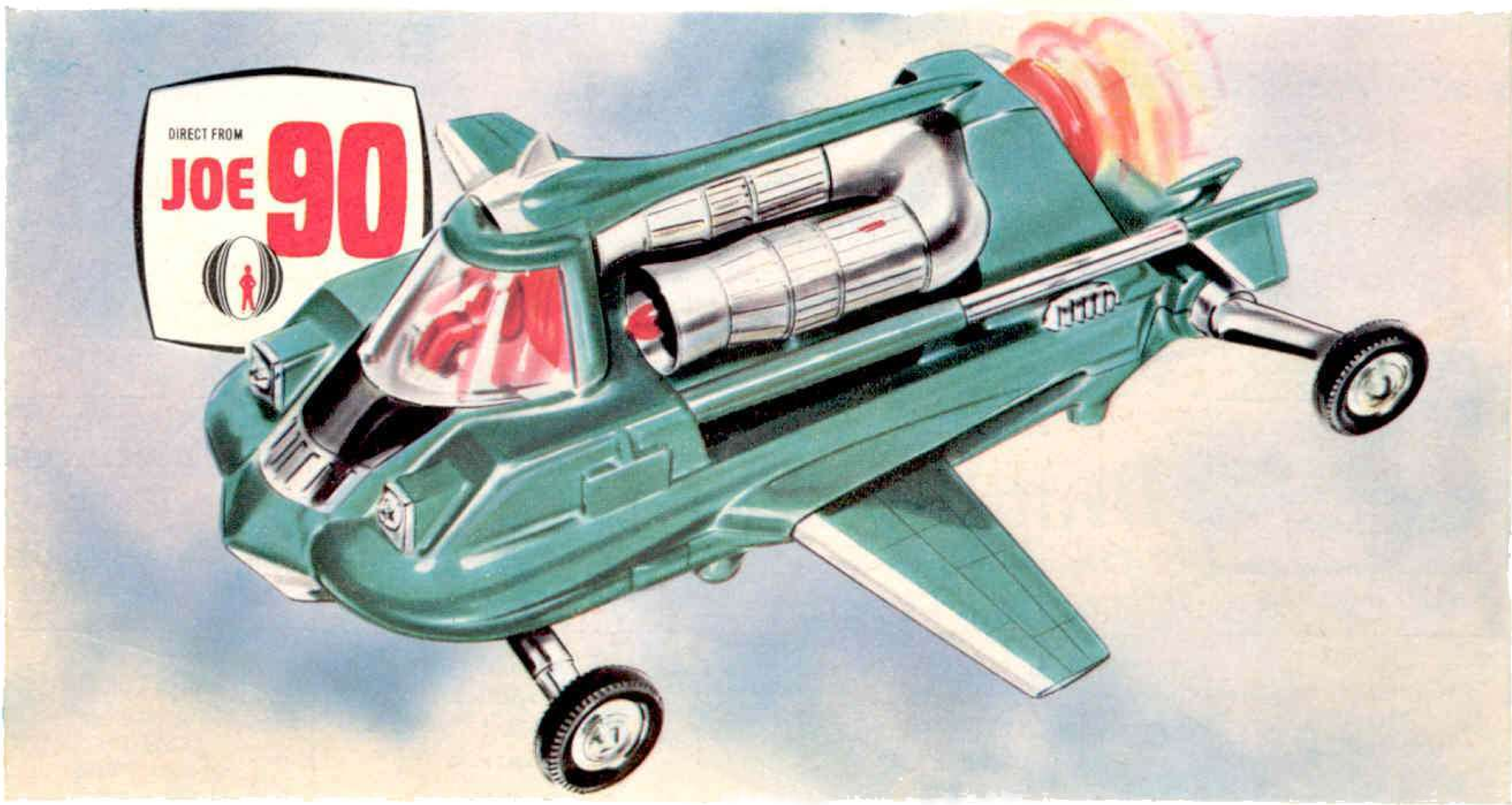

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often a third capacitor between the brushes is used, and chokes (5 micro-henry) in each battery lead are sometimes helpful. If, when testing the radio without the motor running, interference still occurs, the actuator motor is the cause. Chokes and capacitors fitted to its motor will prevent further interference. Such interference is usually fairly obvious, but if there is any doubt, re-check it in the evening. It is known that a great deal of industrial and commercial equipment is a cause of stray interference, and re-checking at night, when factories have ceased work, will eliminate these as a possible source.

TERMS AND DEFINITIONS

Actuator – an electro-mechanical mechanism to move controls.
Aerial – the antenna or conductor used in both transmitter and receiver.
Amplification – increasing the strength of a signal.
Band width – the frequency limits within which radio apparatus works.
Carrier wave – a basic wave of the simplest type.
Cascading – operating one or more additional actuators from the first or main actuator.
Commutator – an instrument for changing the course of an electric circuit.
Crystal – a natural mineral ground to resonate at one fixed frequency.
Electrical link – a connection by wire to pass electric current.
Escapement – an electro-mechanical mechanism to move controls by sequential channel radio.
Frequency – the oscillation speed of a radio signal.
Grommet – a rubber bush designed to protect wires etc. when passed through metalwork.
Key – a term used to describe a switch operated manually.
Mechanical link – a rigid coupling between, say, an actuator and a control.
Micro-switch – a sensitive switch which can control a comparatively large current with a very small operating movement.
Modulated – with the original nature of the radio wave changed in order that it may serve some other purpose.
Radio link – the connection of a transmitter and a receiver by a radio signal.
Receiver – an instrument that receives the instruction sent by a transmitter.
Signal – a transmitted radio wave.
Single-channel – Radio Control gear capable of sending/receiving only one basic signal.
Superhet – a more complex receiver circuit able to be limited to a single exact frequency.
Superregen – the simplest form of radio control receiver circuit.
Tone – a modulated radio signal of a certain frequency.
Transistor switcher – an electronic switch.
Transmitter – an instrument for sending radio signals from one place to another.

SUPPLEMENT WITH MECCANO MAGAZINE,
AUGUST 1969

SIMPLE RADIO CONTROL FOR BOATS

Welcome to Radio 4–2

This first supplement will introduce radio control to many newcomers – very often in the form of father and son teams.

Its purpose is to introduce radio control modelling in its simplest form to those who have never attempted this form of modelling before due to lack of knowledge or lack of funds. We shall be describing the construction and operation of three types of models, a boat, an aircraft and a car and describing the radio control equipment available, keeping the total figure at about £15.

Each model requires its own particular treatment and Radio 4–2 has been produced to cover them all in a simple, step by step way.

Meccano Magazine Model Club

This Club is being formed to bring together enthusiasts, provide them with Membership Badges so that they can recognise fellow members at the pond side or at the flying field and to provide an opportunity of competitions, rallies and outings together.

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INTRODUCTION TO RADIO CONTROL

Radio control is a form of remote control, but remote control normally suggests the use of wires or some other physical communication with the model. A radio control set operates the model by means of wireless waves, the same sort of waves that are used to bring sound to your transistor radio etc.

There are a number of different types of radio control equipment, some of it quite sophisticated, but for the purpose of this short series we are interested in what is known as *SINGLE-CHANNEL GEAR*. The expression 'channel' is probably self-explanatory; if, for example, one has eight channels of control, it means that the model can be reached with any of eight different signals. In the case of single-channel there is only one radio link, and this is normally operated by an on/off button, so that pushing the button causes the transmitter to emit a radio signal which is received

in the model through the aerial of the receiver. All that this does is to cause a change in current flowing in the circuit of the receiver, and this change of current is used to trigger a switch mechanism; thus operation of the button on the transmitter may be likened to simply throwing the switch in the model.

What function operates when the switch is thrown depends entirely on the mechanism that translates the switch into mechanical action, and this is normally called an actuator. Basically, single-channel gear is used to operate the rudder of the model since steering (whether it is in an aeroplane or a boat) is the most important function. It is possible to add further controls operating off the first actuator, to obtain change of speed and other functions, but, again, for the purpose of this article we will consider only the very simplest form of control, which is control of direction.

There are two types of receiver used in single-channel equipment. The first of these has a SUPER REGENERATIVE CIRCUIT (super-regen) and second a SUPER HETERODYNE (superhet). The super-regen is much simpler and has fewer components, and is, therefore, lower in price, so that we shall be concentrating mainly on this type of receiver. A superhet has more components and it enables a selective control to be exercised, so that several such sets can be operated at the same time by appropriate transmitters. A super-regen receiver will respond to any radio wave transmitted in the normal modelling frequency, which is 26·96 –27·28 megacycles. If, therefore, the requirement is to operate a number of models at the same time, it is necessary to go to the extra expense of superhet equipment.

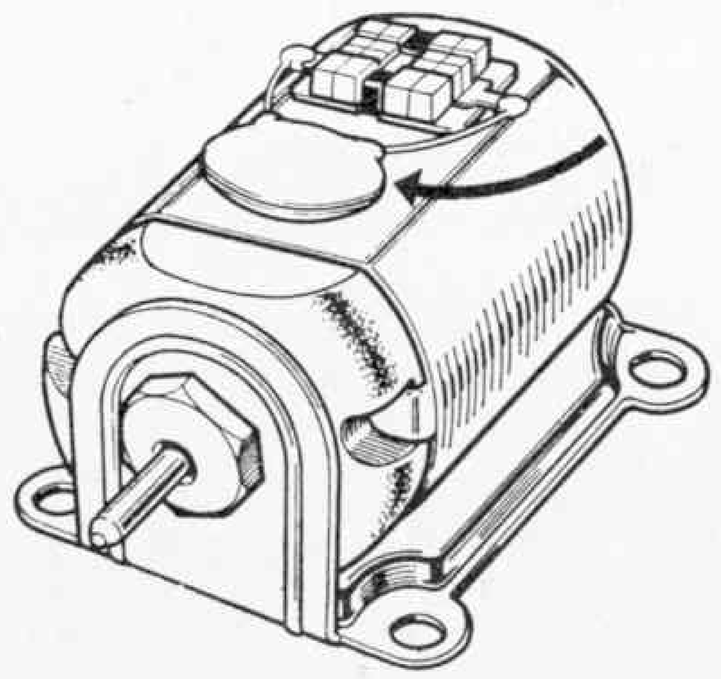
In the early days super-regen equipment operated solely on the presence of a radio wave of any type, but modern equipment operates by means of a tone or note superimposed on the basic radio carrier wave. This has the effect of producing a much more stable receiver, less prone to interference or to wandering off tune of its own accord. There is very little that needs to be known about the circuitry of this equipment to operate it; after all, one does not need to know how a transistor radio works to receive any of the ordinary radio programmes, one switches it on and makes sure that the batteries are fresh. Much the same applies to modern radio control gear. You simply insert the correct batteries in the transmitter and the receiver, switch on, and you should get results.

There are two basic types of radio receiver commonly employed. They are both transistorised, (there are no glass valves as in old type equipment) but one type of set is fitted with a RELAY and the other is known as RELAYLESS. A relay is an electro-mechanical device where the current change in the receiver is used to energise a coil and cause a metal blade to swing across to close a contact. Through the closed contacts any electrical current (up to about an amp) can be passed, so that this basically is an electrical switch. A relayless receiver does much the same thing, but uses a transistorised switcher. The difference here is that the action is more difficult to understand and the limit of the current that can be passed through the switch is considerably lower. Very few transistor switchers will pass more than about 500 milliamps, so that for any actuator or escapement which

cont. from page 10)

like modern light switches, are made of white plastic. Positioned on the front of the case, the on/off switch is on the left, and the signal switch on the right.

The relayless receiver is housed in a steel case, covered with a grey vinyl plastic. This is considerably larger than previous receivers, measuring $2\frac{1}{2}$ in. by $1\frac{3}{8}$ in. by $1\frac{1}{8}$ in. The $29\frac{1}{2}$ in. aerial comes out at one end, and is protected by a rubber grommet. From the other end comes the battery leads connected to an on/off switch, and a battery holder. Also, from the same hole emerges the actuator leads. All these wires are protected by a rubber grommet.



Generally, a single ceramic capacitor soldered across the motor brushes, will suffice.

sparks change the current in the receiver, just as a deliberately transmitted signal, and in a relayless set, even the slightest change will often trigger off the transistor switcher. In a relay set with a proper adjusted relay, the switching level is most likely higher, since a minimum is needed to throw the relay blade; thus interference is less likely to occur in these sets. We are referring here, of course, to single-channel equipment, where most of this trouble arises.

If interference is encountered, there are certain preventative measures that can be taken. The distance between the source and the receiver is the best answer, but of course, there are limits to this! Also, keep the receiver aerial away from the source and the batteries; a vertical whip aerial is best but make sure that the total length of the aerial is as recommended by the set manufacturers. Placing a flat aluminium screen between the source and the set is often useful; if the source is a petrol motor, use a screened plug lead and fit a normal car-type suppressor. Where joints in control links occur, use metal to plastic, never metal to metal.

Electric motors invariably need a capacitor, normally of ·01 to ·05 microfarad from each brush to the motor frame. It is advisable for the frame to be earthed; the propellor shaft tube is a suitable place. Very

ency.

The relay receiver measuring 1 in. x $2\frac{1}{8}$ in. nylon, plastic-coated aerial emerges from one end and the necessary battery leads from the other. No socket is fitted. There are no grommets fitted to the wiring on either of the above. This outfit is suitable for motor control escapements, compound rudder escapements and electric actuators. Wiring instructions are given and included with the instructions with the set. Transmitter batteries are 9 volt, receiver batteries, three 1·5 cells, i.e. total $4\frac{1}{2}$ volt.

RCS GUIDANCE SYSTEM

The RCS transmitter is fairly large by general standards, and with a depth of $2\frac{1}{2}$ in. might be rather a handful for the small hands of a boy. It is, however, an extremely robust case in steel, finished in attractive grey hammer finish. The on-off switch is situated at the top right corner on the front of the case, and immediately below it is situated the tone button. This is in fact microswitch operated, requiring very little effort to operate, particularly useful for the speedy action required to operate motor control.

The complete case dimensions are as follows – length $5\frac{1}{2}$ in., depth $2\frac{1}{2}$ in., width $3\frac{1}{2}$ in.

The telescopic six-section aerial which can be simply unscrewed from the case for removal measures $12\frac{1}{2}$ in. closed and expands to 5 ft. 7 in.

The relayless receiver measuring $1\frac{3}{8}$ in. x $1\frac{7}{8}$ in. x $\frac{7}{8}$ in. deep is moulded in high impact resisting nylon material. The yard long plastic coated aerial emerges through one end of the case and is protected by rubber grommet from chafing against the case. At the opposite end of the case the escapement and power wires etc. emerge and are supplied with a small polarised plug.

The receiver is completely transistorised and shock resistant, and as supplied is intended for operation of rubber-driven escapements. To operate a clockwork escapement by the electric actuator would involve slight wiring alterations and the addition of a 30–100 ohm relay. Wiring dimensions for relay addition are given in the instructions. Transmitter batteries are 9–12 volt, one 9 volt PP7 is suitable for short range work. Receiver batteries are three $1\frac{1}{2}$ volt pen-cells, i.e. total $4\frac{1}{2}$ volt.

MAINSTREAM

The Mainstream transmitter is another small piece of equipment, measuring only $3\frac{1}{2}$ in. by 1.13/16 in. by $4\frac{1}{4}$ in. The case has a red mottled finish and is covered by what appears to be a vinyl plastic. The back of the case slips off for easy access to the batteries. The 5-section aerial measures 5 in. when retracted and $34\frac{1}{4}$in. when extended. Its base is formed by a large plastic grommet. The on/off and keying switches, which are

needs a reasonable amount of current to make it operate, the transistor switcher is not really adequate. Excess current heats up the transistors and usually results in the last one in the circuit blowing and the control goes dead.

An aeroplane model can normally use a rubber-driven escapement in which a pawl is attracted away from its rest position by means of a coil. The current used in doing this is very small, so that a relayless receiver is perfectly adequate for it. With a boat, however, there is difficulty in accommodating the rubber motor necessary to drive one of these escapements, and there is also a limit to the number of turns that could be put on such a rubber motor. It is, therefore, normal to use an electric actuator, and the current drawn by the motor of this actuator can be in excess of what is safe for a transistor switcher. For boat use, therefore, it is normal to use a relay receiver. In buying the receiver one has to pay a few shillings more for the relay, but the necessity of having amplification circuits between the receiver and the actuator is avoided, so that ultimately money can be saved. The one disadvantage of a relay is that if it passes a fairly heavy current over a period of time the points tend to become blackened and may need cleaning and resetting. This is a job that requires a fairly expert touch because the relay is a relatively delicate mechanism and can quite easily be put out of true.

With single-channel equipment, the normal control is sequential; by this is meant that if one can have left rudder on one press of the transmitter button, to reach a position in which left rudder can be applied again the control must pass through right rudder before returning to neutral. With a clockwork or rubber-driven escapement it is normal to have two neutrals, so that with the transmitter switched off the escapement is on neutral, one press of the button moves the rotor 90° and gives, say right rudder, release of the button moves the rotor another 90° and gives the second neutral. A further press gives another 90° and left rudder, and yet another brings it to the original neutral. Thus to go through one rudder position to reach the other, one must press, release, and press again, and one must always remember which neutral the escapement is lying on, i.e. which rudder was used last.

With electric actuators remembering is done for the operator in that there is only one neutral position. One press from this gives, say, left rudder, and release takes the operating arm through the right rudder position back to the original neutral. To get the opposite rudder one must press, release, press and hold, and upon release the rudder returns again to the same neutral. With the speeds used in models fitted with single-channel equipment the movement of the rudder in the opposite direction to that required is not a serious drawback. It is most noticeable with a boat, where as the rudder flicks through the unwanted position the stern of the boat may give a little wag, but it is so brief a movement that no serious deviation of course is made.

It is a fact that most single-channel radio control equipment is made for aircraft use and that in most aircraft rubber-driven escapements are the simplest and easiest to use. There are, therefore, relatively few boat actuators, but those that do exist are listed elsewhere in this booklet. Similarly, available single-channel radio equipment is listed,

with an indication as to whether it is relay or relayless and which actuators it is safe to use.

At one time wiring up of the receiver and associated equipment was quite a complicated business, but nowadays most sets are sold ready wired and requiring only to be plugged together. This normally entails only plugging in a battery, or in some cases inserting batteries into a battery box, and plugging in the escapement or actuator. At the most two soldered joints in wires are all that is likely to be called for. Some sets include a switch in the wiring of the 'harness' supplied with them, in others it is necessary to unplug the receiver from the batteries to switch it off. All sets are supplied with instructions by the manufacturer and these should always be read most carefully before inserting any batteries or plugging anything together. As far as possible the sets are made foolproof, but it is quite easy to damage a set if, for example, the batteries are connected with reverse polarity.

In use the essential thing is to keep water off the receiver. Most model boats, for example, tend to accumulate a little water in the bottom which may come up the rudder or propellor tube, and to have a receiver lying in this water is to be avoided. Most receivers are so small that they and their associated batteries can be fitted in a small, plastic bag, even a soap dish, which will keep them clear of water. The actuators themselves can to some extent be waterproofed but it is often enough to mount them clear of the floor of the hull; endeavouring to mount them in a waterproof container can lead to problems in getting free movement of the linkage to the rudder.

LICENCE REQUIREMENTS

First, before he is legally allowed to transmit, the modeller must acquire a licence. This is obtained by filling in an application form and sending it with your remittance fee of 30/– to:–

The Radio Branch,
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GPO Headquarters,
London, E.C.1.

The licence lasts for five years and needs no examination or technical test. There are, however, certain limitations. The station, as the radio equipment is called, can only be used within a five-mile radius of the local Head Post Office, and can only be used outside this radius, upon notification to the GPO Telephone Manager. Also, the station can only be used with specified radio signals, and must not exceed a specific power. Lastly, the station can only be used by the Licensee or by any other person authorised by him.

There are two main reasons for having a licence, one as we said before, it is illegal to transmit without a licence and two the more licence holders there are, the bigger say the modellers will have in any dispute with the GPO.

Also, the modellers' equipment must only be operated within a specified frequency range which has been allocated by the GPO for radio control purposes in this country. These frequencies cover the band 26.96 megacycles/second to 27.28 megacycles/second. However, the modeller using commercially-supplied equipment does not have to bother about this, since the equipment has been designed and checked for operation within this band.

MACGREGOR

The MacGregor radio control transmitter is a very handsome-looking piece of equipment indeed. The case, apart from being attractive, is also very practical and rugged in construction, yet weighing only $6\frac{1}{2}$ ounces. The sides are made of unbreakable nylon and the front, ends and back are of polished metal finished in metallic blue. The case measurements are 6 in. x $3\frac{3}{8}$ in. x $1\frac{1}{4}$ in. The on/off switch and tone button are on either side of the face, the button being on the right hand side. This is again of the microswitch type. Aerial dimensions are $42\frac{1}{4}$ in. when extended, and 3.3/16 in. when retracted.

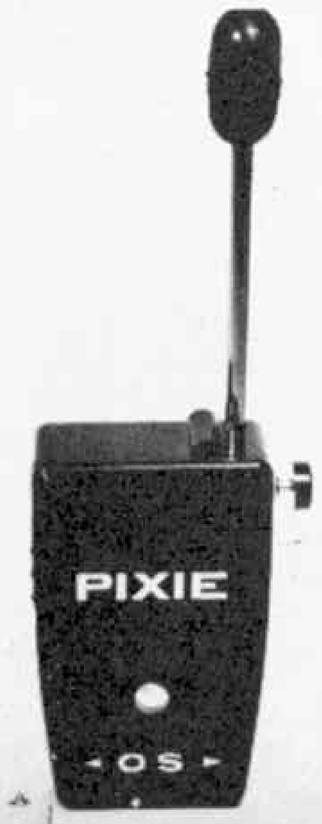
The power supply for the transmitter is six $1\frac{1}{2}$ volt pencells giving a total of 9 volts.

The Minimac relay receiver is made of the same robust materials as the transmitter. The aerial and battery leads, situated at either end,

are both protected by grommets. The aerial wire is 30 in. long. All MacGregor receivers are designed to operate from a 9 volt battery, and all battery leads have a 7-pin connector plug. Receiver dimensions are $2\frac{1}{4}$ in. x $1\frac{1}{2}$ in. x $\frac{7}{8}$ in.

PIXIE O.S.

The Pixie transmitter although fairly small has its operating button on the side and is intended to be held up, i.e. with the button facing the operator. This gives the case a depth of just over $2\frac{1}{2}$ in. which could cause a bit of trouble for small hands. As with the RCS system, the tone button is microswitch-operated requiring very little effort to operate and enabling rapid signals to be given. The on/off switch is operated below the tone button and when in the on position is protected by two plastic lugs reducing the possibilities of it accidentally being knocked off whilst the model is being operated. The case is constructed from plastic and measures $2\frac{1}{2}$ in. deep, $1\frac{1}{4}$ in. wide, 4.7/16 in. long. The aerial is in two parts and of eight sections measuring 12 in. closed and 3 ft. 1 in. extended. This is fairly short by general standards. This being due to the fact that it is centre-loaded, i.e. it has a coil contained in a plastic 'bubble' which increases its efficiency.



GEM Mk. III

The Gem transmitter has been designed for convenience as well as reliability. Its slim case will fit easily into a jacket or coat pocket and when in use can be held quite comfortably by even the smallest hands. The transmitter's case dimensions are $1\frac{3}{8}$ in. deep, $3\frac{1}{2}$ in. wide and $4\frac{1}{2}$ in. high. Its weight is only 12 ounces including batteries. The steel case is covered with what appears to be Vinyl plastic. The on/off switch and tone button are positioned side by side on the front. The tone is yet again of the microswitch type enabling precision control to be obtained. The aerial is composed of 10 sections measuring 42 in. when fully extended and down to 2 in. when closed.

The relayless receiver measures 1.7/16 in. x 1.7/16 in. x $\frac{7}{8}$ in. and is covered in the same attractive casing as the transmitters. The aerial wire, which is 30 in. long, and battery leads are next to each other: grommets are fitted to both of these. Wiring instructions are included with the set.

Power supply for the transmitter is 9 volts consisting of 6 x HP7 pencells. For the receiver it is only 6 volts consisting of 4 x HP7 pencells.

PATHFINDER

The Pathfinder transmitter, although not very large, weighs quite a lot. This being 16 ounces including batteries. The case, measuring 6 in. x $3\frac{1}{2}$ in. x $1\frac{1}{2}$ in., is covered in a red material, and has a handy open and shut snap case. The on/off and tone buttons are, as with the Gem, side by side on the face of the case. The button is rather stiff compared with the micro-switch types, but still, it does the job. The aerial has seven sections, and measures $39\frac{1}{2}$ in. when extended, and 2 in. when retracted.

The relayless receiver is supplied in a strong plastic case measuring 2 in. x $1\frac{3}{8}$ in. x $\frac{3}{4}$ in. The battery and aerial leads are at either end of the case, both fitted with grommets.

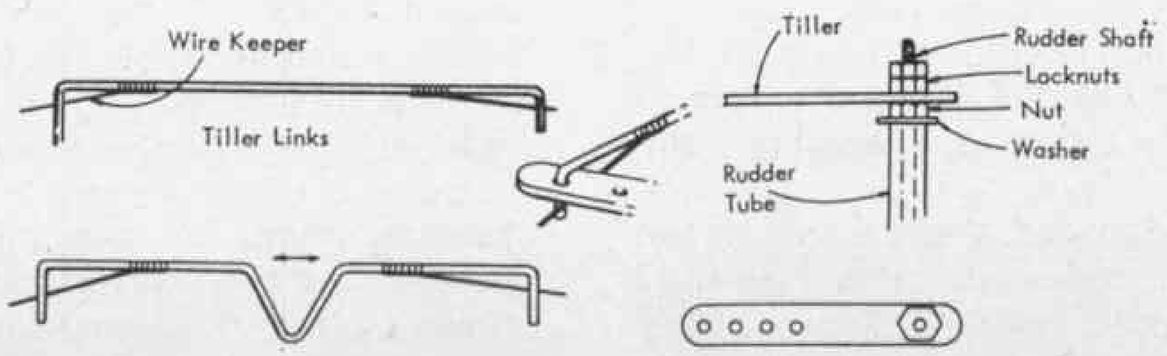
Supply voltage is 9 volts for the transmitter and the receiver. For wiring instructions a simple diagram is included.

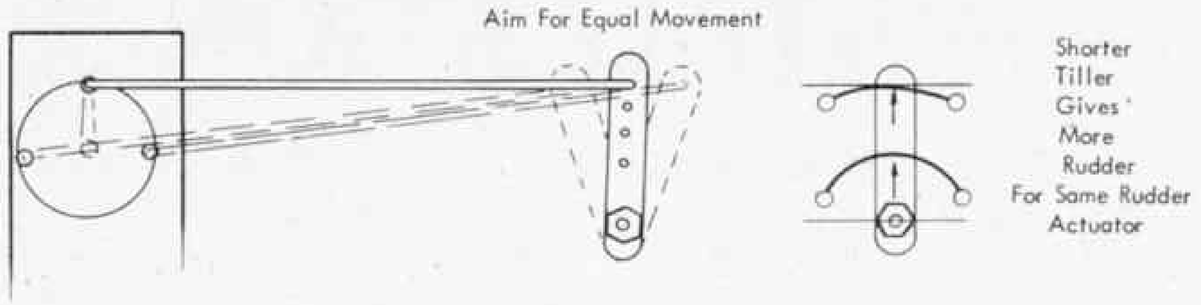
INSTALLATION

The main requirement of a boat installation is that the receiver should be completely waterproof and that it should be protected to some extent from shock and vibration, mostly arising on carrying the boat in the boot of a car etc. This is best achieved by mounting the receiver in a cut-out in a foam rubber block or even in expanded polystyrene. Plastic foam is not normally recommended since this can compress to nothing and does not absorb shock in the same way as natural foam rubber. The batteries can be included in the same block, if required, and then the whole block fitted into a polythene bag, the neck of which is secured firmly by a rubber band through which the wiring from the receiver emerges. The completed bag can then be held down in the boat by means of rubber bands attached to small hooks in appropriate places.

In the boat which will be described in our next issue a vacuum-formed plastic hull is available and to mount the radio equipment in this it is suggested that a balsa floor is put into the hull and across this floor is mounted a platform, also of $\frac{1}{4}$in. balsa, on which the radio equipment can be fitted. As an alternative to a plastic bag, the receiver and batteries can be installed in a small plastic food container and the wires can be passed through a slit in the side of the container, the slit being filled with an adhesive of the flexible type such as Bostik No. 1. With the lid on the box it should then be possible to immerse the entire box in water without any finding its way inside. The foam rubber is still needed to cushion the receiver inside the box.

The actuator or clockwork escapement which would normally be used for a model boat can be screwed to the back of the balsa platform, the screws being passed through the feet of the actuator case into the balsa, then withdrawn, balsa cement squeezed into the holes, and the screws replaced. This will provide a firm fixing unless very soft balsa has been used. The diameter of the actuator operating arm and the length of the tiller need to be related in order that an adequate rudder movement is achieved. The shorter the tiller, the more rudder action there is for a given amount of actuator movement, or the longer the actuator arm is made the more rudder movement there will be. About 25° each side of neutral should be adequate for most boats. As the actuator arm takes a circular path and tiller swings in an arc, it is possible in some installations for there to be more rudder applied in one direction than the other. To





obviate this the tiller link should be kept at right angles to the tiller as far as possible when the actuator is in the neutral position. It is quite a good idea to move the actuator around before finally fixing its position, in order to achieve the position in which rudder movement is equal.

The tiller link itself is normally of wire. There was a time when metal output shafts were used on the actuators, and if a metal tiller was fitted with a metal linkage there was interruption to radio by a capacity effect. However, most actuators nowadays have a moulded plastic output arm; if this is not so, the tiller can be cut from a piece of insulating material such as Paxolin or thin Perspex. The use of a wire tiller link is helpful since if a kink is put in the link as sketched, it is possible to close or open up the kink in order to neutralise the rudder position exactly without interfering with the throw of the tiller geometrically. Each end of the tiller link should be fitted with a wire keeper. This also is sketched. Basically, the tiller is, say, 18 gauge piano wire, and a small 24 or 26 gauge 'whisker' is bound and soldered as sketched. When the vertical arm of the keeper is pushed through the hole in the tiller, the keeper is flicked underneath so that the tiller link cannot be lifted out of the hole. With one actuator, the Unimite, the vertical part of the link is fitted down the centre of the tubular rivet which forms the end of the actuator operating arm, and the keeper can then be flipped under the flange of the rivet.

A sketch is also given of the normal type of fastening for the tiller itself. The rudder tube is normally taken up inside the boat to a height well above water level in order that water will not find its way up the tube and into the boat. The rudder shaft is longer than the tube and projects through the top. A washer and nut is then threaded on so that the rudder is lightly clamped into the tube. The tiller is now put into position and a further nut screwed on top, the bottom nut then eased back up to clamp the tiller and also to allow the rudder to swing freely. A second lock nut is then placed on top of the upper nut and tightened up completely. It is, of course, possible to use a completely circular tiller, say a gear wheel or something similar, with holes drilled to accept the tiller link. This allows finer adjustment if the holes are graded gently in and the wheel is turned, by slacking off the nuts, to a new position. Most models, however, find a straight tiller adequate.

It will be noted in one sketch that alternative holes are provided to increase or decrease the rudder throw as necessary. It is desirable to check which hole is to be used before finally screwing down the actuator, in order that the tiller link should remain at right angles to the tiller.

Some actuators are made for surface mounting, for example, in an aircraft, and the best way to mount these in a boat is to make a little

OUTFIT REVIEWS

A.B.C.

The A.B.C. transmitter is very much bigger than most types. It is very square, very bulky, and weighs 2 lb. The case, measuring 6 in. by $4\frac{1}{2}$ in. by $2\frac{1}{2}$ in. has an attractive aluminium, light blue/silver hammer finish. The 10-piece chrome-plated telescopic aerial is detachable, and measures 3 in. when retracted and 44 in. when extended. On/off switch and tone button are arranged one either side on the front of the case. The micro-switch tone button has a convex surface which makes it very smooth to operate. The power supply for the transmitter is two 6-volt PP1 batteries, giving a total of 12 volts.

The relay receiver is covered in a gloss metallic blue case. This measures $2\frac{1}{8}$ in. by 1.5/16 in. by 1 in. The four battery leads are at one end of the receiver, and the 39 in. aerial is at the other. Both are protected by rubber grommets. The

power supply is a 9-volt battery, usually a PP3 or an equivalent.

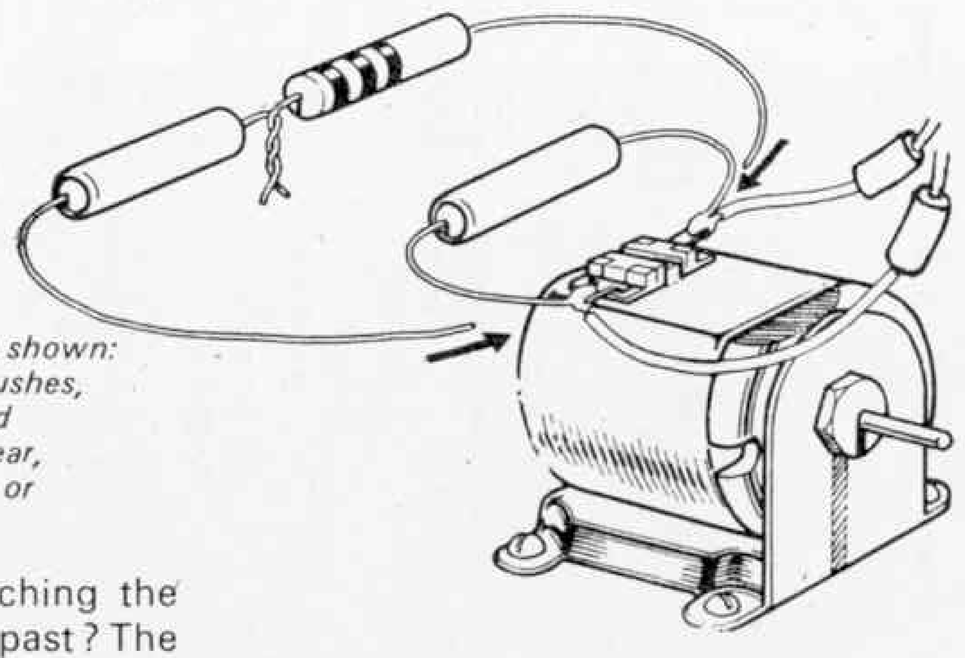
Futaba

The Futaba transmitter is a rather small piece of equipment, its dimensions being 1.7/16 in. x $2\frac{1}{4}$ in. x $4\frac{3}{8}$ in. Its weight, $4\frac{1}{2}$ ounces, and its size go to show that it can be held easily in a lad's hands. The case, made of strong plastic, has a detachable back for easy access to the batteries. The on/off switch, situated on the side of the case, is like an ordinary light switch. Positioned in the centre of the case is the micro-switch tone button. The aerial is detachable and can be screwed into the top of the case. When retracted it measures 6 in., and when the seven sections are extended it measures 42 in.

The relayless receiver is covered in an all-metal case measuring 1.9/16 in. x 13/16 in. x $1.\frac{1}{8}$ in. The aerial wire, measuring $31\frac{1}{2}$ in., emerges out of the top, and the battery leads from the side. The battery leads are protected by a grommet and have a 3-pin connector plug on the end.

Manufacturer	ACTUATORS AND ESCAPEMENTS				Combined	Remarks
	Title	Distributor	Rudder	Throttle		
R.M.K.	E.200 Dynamite	Ripmax	£6 2 0			
R.M.K.	E.201 Dynamo	Ripmax		£5 17 0		
R.M.K.	E.300 Dynamite'S	Ripmax	£6 15 0			
R.M.K.	E.301 Dynamo 'S'	Ripmax		£6 15 0		
Orient	OR1 Minimite	Ripmax	£3 9 6			
Orient	OR2 Minimo	Ripmax		£3 9 6		
O.S.	S-103	Ripmax	£5 13 0			
O.S.	S-104M	Ripmax		£4 16 0		
Graupner	E. Keil Kinematic	Ripmax			£5 2 6	Gives forward, reverse and stop motor control
Climax	Unimite	C & L Development	£4 7 3			

ELECTRICAL INTERFERENCE



In the accompanying sketch are shown: A capacitor across the motor brushes, chokes on both motor leads, and capacitors between the brush gear, earthed to the motor framework or propeller tube.

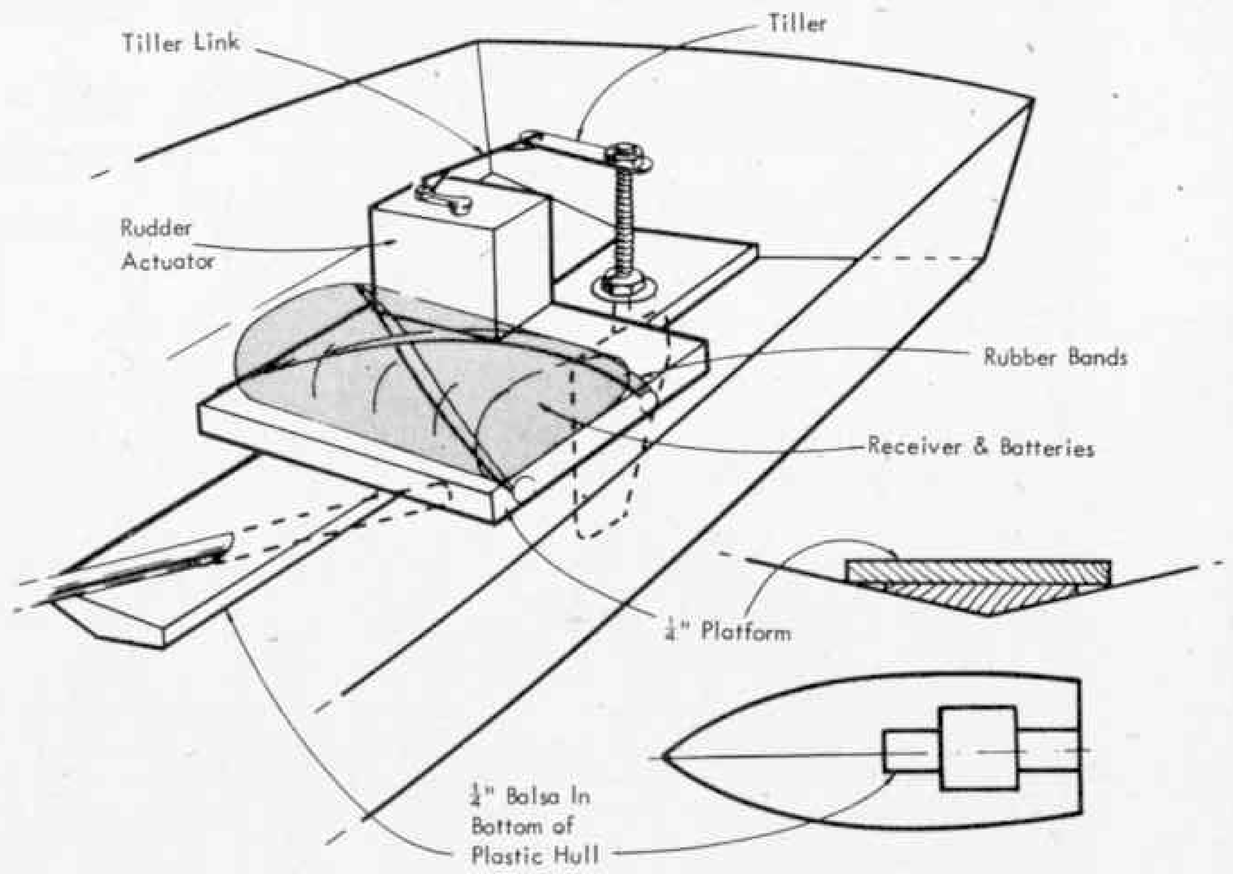
Have you ever been watching the television when a car goes past? The picture starts jumping about and loud cracking noises are all that can be heard. This is caused by crude radio waves, emitted from the car's sparking plugs, interfering with the television reception. Nowadays this does not happen so often, as most cars are suppressed. It does, however, occur quite a lot with sensitive radio control equipment, and can send a model haywire. Modern radio control equipment is frequently desensitised to strengthen its resistance to outside interference. This does reduce its range, but provided it works over water at up to 200 yards, this is for most modellers, quite sufficient.

The cause of this interference could be that the equipment is being used too near a spark ignition engine or an electric motor which sparks excessively at the commutator. The radio waves from these

(cont. on page 15

balsa box into which they can be fitted, and screws passed through the mounting flange into the sides of the box. This box can then be cemented to the suggested platform in the appropriate position.

An important point in using a radio receiver is to stick to the maker's recommended aerial length and few boats give quite enough length to enable this to be done. If the aerial is doubled back on itself its effective length is halved. The



most efficient form of aerial for a boat is a vertical one, known as a whip aerial, and this need only be a piece of piano wire fitted into a bush in the deck, the aerial from the receiver being soldered or held to the bottom of the bush by means of a nut. Range with a whip aerial is considerably increased, since a horizontal aerial on a boat is very near the water and at great range the radio waves can be weakened by absorption into the water surface. The whip enables normal strength waves to reach the aerial at long distances.

All joints in wiring should be supported by being tied off to some part of structure, short of the plug. If a wire is stretched tight and vibrating it will eventually fracture at the plug joint, but by binding off the wires to parts of the structure or to screws or eyes driven into the structure, the strain on the wires is put on the insulating sleeve and not on the wire where it is soldered to the plug etc. Where possible the wires should be run neatly along the side of the boat out of sight, or at least out of the way of the main part of the boat. We have seen models go out of control because a loose wire fouled the tiller and made it impossible to bring the rudder to neutral!

AVAILABLE RADIO EQUIPMENT

Make	Title	Distributor	Super Rx	Regen Tx	Price	Harness	Equipment will work with equipment shown with dots				Batteries		Instructions supplied with set	Remarks
							C'work Act'	Rubber Esc'	Elec' Motor	Act' Rudder	Tx	Rx		
A.B.C.	Minisonic	E. Keil & Co. Ltd.	Relay £6.17.8	£8.4.10	£15.10.8		●	●	●	●			Good	Supplied with tuning tool
A.B.C.	Minisonic	E. Keil & Co. Ltd.	Relayless £5.16.8		£14.9.8	includes mini plug & socket	●	●			12v 2 x PP1	9v PP3	Good	Supplied with tuning tool
Futaba	FR71	Ripmax	Relayless £5.19.6		£12.12.6	includes mini plug & socket	●	●			8 pen or HP7	PP3 9 volts	very good	
Futaba	FR72	Ripmax	Relay £6.16.6		£13.9.6	includes mini plug	●	●	●	●	8 pen or HP7	PP3 9 volts	very good	
Gem	Mk. III	E. Keil & Co. Ltd.	Relay £7.6.11		£15.14.11	plug not inc.	●	●	●	●	6 pen or HP7	4 pen or HP7	Fair	
Gem	Mk. III	E. Keil & Co. Ltd.	Relayless £6.4.0		£14.9.0	plug not inc.	●	●			6 pen or HP7	4 pen or HP7	Fair	
MacGregor	Minimac	Ripmax	Relay £5.19.6		£14.14.0	includes plug	●	●	●	●	6 pen	PP3 9 volts	very good	Kinematic pack £5.19.6
MacGregor	Minimac	Ripmax	Relayless £4.19.6	£9.9.6	£13.13.0	includes plug	●	●			6 pen	PP3 9 volts	very good	Relay conversion £2.9.6
Ogawa	O.S. Pixie	E. Keil & Co. Ltd.	Relay £6.5.7		£16.4.0	plug not inc. With battery clip	●	●	●	●	PP3 9 volts	PP3 9 volts	Good	Available with earphones for help in tuning.
Pathfinder Radio Control Ltd.	Path-finder	Ripmax	Relayless		£11.4.0	socket and battery clip	●	●			9 volts PP6	9 volts PP3	Fair	Relay pack 35/6d. Escape pack 39/6d.
R.C.S.	Guidance System Mk. III	Radio Control Supplies Ltd.	Relayless £6.10.0	£7.10.0	£13.0.0	no plug inc.	●	●			12 volts 2 x PP1	3 pen 4½ volts	Good	
Roland Scott	Navigator De-Luxe	Roland Scott	Relay £12.19.6 Relayless £11.19.6	£7 appx.	£19 appx		●	●	●	●			very good	
Mainstream	Supergen	Main-stream	Relayless £5.10.0		£11.19.0	no plug inc. batt. box and switch	●	●			9 volts PP7	2 pen 3 volts	very good	
Mainstream	Supergen	Main-stream	Relay £6.10.0		£12.19.0	no plug inc. batt. box and switch	●	●	●	●	9 volts PP7	2 pen 3 volts	very good	

AVAILABLE MOTORS

Manu-facturer	Title	Distributor	Voltage Range	Method of Mounting	Weight Ozs.	Current Consumption	Boat Performance (Speed)	Price
Marx-Luder	Deca-perm	Ripmax	3–12	Base	7¼	Heavy	Fast	49/6d.
Marx-Luder	Mono-perm Super	Ripmax	6 or 12	Base	3½	Light	Fair	36/–
Marx-Luder	Mono-perm Super-Special	Ripmax	6 or 12	Base	3½	Moderate	Good	42/6d.
Graupner	Nauto-craft	Ripmax	6	Base	12	Very Heavy	Fast	79/6d.
Mabuchi	Orbit 405	Ripmax	3–4½	Base	1¾	Moderate	Fair	5/11d.
Mabuchi	Orbit 505	Ripmax	3–6	Base	2¼	Moderate	Fair	6/6d.
Mabuchi	Orbit 705	Ripmax	4–8	Base	5	Fairly Heavy	Fast	42/6d.
Taycol	Target	Keil Kraft	6–12	Base	8	Moderate	Good	37/4d.
Johnson	120	Keil Kraft	4½–9	Base				3/8d.
Johnson	140	Keil Kraft		Base				4/6d.
Johnson	160	Keil Kraft		Base				5/6d.
Johnson	170	Keil Kraft		Base				6/6d.

Cheaper motors from the 'Johnson' and 'KAKO' range would be suitable for a lower performance